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Custom-built Replacements

AN order from B.E.A. for a mere 15 aircraft designed to replace Rapides for certain specialized duties is not likely to be an attractive proposition for the British aircraft manufacturers or for the British taxpayer. The Corporation has submitted (some details were given recently) that only an aircraft designed especially for the purpose could be operated economically over the short Scottish routes. The ideal specification has been agreed by the several airways committees concerned with re-equipment and an order straight off the drawing-board would probably be given for a satisfactory design. Although such an aircraft might possibly be suitable also for operation in other parts of the world, the requirements for small-airfield performance are likely to limit its general usefulness.

To some British manufacturers the announcement of the B.E.A. specification will seem like an invitation to build virtually in competition with their own private ventures, and the possibility of a fairly extensive modification to an existing design may seem preferable. Also, this might possibly offset to some extent the undesirability of introducing another type. The disinterested taxpayer, on the other hand, can hardly be blamed for asking if it would not be cheaper to extend a few airfields.

It has been stated by the Corporation that Rapide losses could be further reduced by detailed improvements in operational methods, but that to turn a loss into a gain this special design would be required. The margin between the reduced loss and this gain would (allowing for the high cost of a small order) probably be narrow. The placing of a ceiling price on the new project to avoid defeating the object of the replacement would be worth consideration.

B.E.A. are not the only operators who seek a Rapide replacement. Has not the time arrived when the needs of the charter companies might receive greater recognition? Whether or not some could afford the cost of new aircraft is admittedly doubtful, but many must have replacements. Their views should be sought, for in the face of considerable discouragement they continue to operate over distances and from fields not unlike those of the Corporation's Scottish routes. These private-enterprise operators also require replacements both for their DC-3s and for their four-engined stop-gap transports.

Farnborough Fever

NOT least of the excitements associated with the S.B.A.C.'s annual display is the sporting uncertainty before the events. This year the Brabazon I is the central theme of rumour-ridden conjecture. Will Farnborough, it is everywhere asked, see this most majestic of airliners on one of its early flights, or must "Bill" Pegg wait another year to display his costly charge to our foreign guests? No one, of course, can possibly know, even at this late hour; but Bristolians who are well placed to follow progress are certainly not unhopeful. More engine runs, and the handing-over to the flight-test section, are expected this week. Burnished till she resembles one of Bristol's marvellous silver models, emblazoned with the Union Jack and registered G-AGPW, the Brabazon was viewed by *Flight* in her vast hangar a few days ago, sitting squat on her new undercarriage—which now, incidentally, has four Dunlop wheels to each main oleo, but is not to be confused with the bogey gear foreseen for the Mk 2. Static tests were going ahead well, but access to the graceful giant was rigidly barred, and rightly so, for sightseeing must not be allowed to prejudice in the slightest degree the chances of showing the flag next month.

The world's largest airliner, however, is not the only possible addition to the list of Farnborough participants published on page 220 of this issue. Three other important types may yet receive M.o.S. clearance to attend, though these, being so new and security-wrapped, must not be named. On the debit side is the Saro A.1 jet flying boat, which performed so astoundingly last year. But there are usually disappointments as well as unexpected fulfilments at what is justly advertised as "the world's greatest flying display."

B.A.F.O. AIR SHOW

"Hendon Display" Atmosphere in German Surroundings

Illustrated by "Flight" Photographs

Service spectators get a grandstand view while Mosquitoes begin their bombing-run over the set-piece.

NEWS of the Berlin Air Lift has inevitably formed the bulk of information on air affairs in Germany for over twelve months. Nevertheless, we felt convinced, after a seven-hour stay in Germany on Tuesday of last week, that the British Air Forces of Occupation, even if temporarily overlooked by the public eye, have meanwhile trained hard to maintain, and increase, efficiency in their military duties.

That so definite an impression could be received in so short a time was made possible by the full and representative air display which B.A.F.O. staged at R.A.F. Station Gütersloh on that day.

In perfect summer sunshine, crowded with aircraft and decorated with Allied flags, the airfield presented an attractive picture to a visitor from the United Kingdom. He could scarcely be blamed for feeling that this was a station in Britain, for, on first inspection, the differences were few. On closer scrutiny there were the parked Volkswagens, the Luftwaffe-designed buildings, and the "Bafs" which—in lieu of silver and copper coinage—passed between Service spectators and attendant Naafi vans.

An official list referred imposingly to "V.V.I.P.s" and, indeed, many notable guests were present. They included Lord Tedder, the present Chief of Air Staff, and his successor-designate, Air Chief Marshal Sir John Slessor, Air Chief Marshal Sir James Robb, Air Marshal Sir Arthur Sanders, General Sir Brian Robertson, and Lt.-Gen. J. K. Cannon, Commander of the U.S.A.F. in Europe.

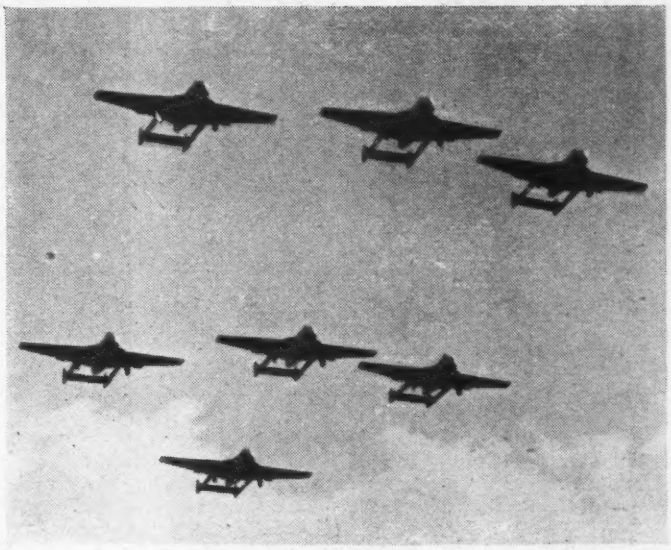
The enclosures must have contained as many soldiers as airmen, and the uniforms were not exclusively British. All nations of the Western Union were represented.

Ground crews were among the pilots in the first item on the three-hour flying programme. This unusual but praiseworthy state of affairs is explained by the gliding proficiency attained in off-duty hours by many non-flying, as well as aircrew, members of the Occupation Forces. Two Grunau Baby sailplanes were winch-launched simultaneously and their pilots (shrouded, like many other performers during the afternoon, in anonymity) executed some very stylish aerobatics, enlivened by the discharge of red smoke from their fuselages. From the French commentator (a continual description of events was relayed, in turn,

Among those who watched the B.A.F.O. demonstration were (left to right) Lord and—wearing the Malcolm Club uniform—Lady Tedder, Air Chief Marshal Sir John Slessor (who succeeds Lord Tedder as C.A.S. next January) and Air Marshal T. M. Williams, the A.O.C.-in-C., B.A.F.O.

by British, French and German spokesmen) we learned that the next performer, an exposed S.G.38 primary glider, which ascended with a pink, Jato-like trail in its wake, also carried smoke canisters, and was definitely not "équipé avec jets." Admiration was expressed when the S.G.38 pilot brought his machine silently over the enclosures, with his feet clear of the rudder bar and dangling literally into space. Representing the opposite end of the soaring scale was the cream Weihe sailplane, flown skilfully in keeping with its high-performance characteristics. There followed a photographic run of the enclosures by a tactical-reconnaissance Spitfire 18.

Meteor aerobatics, well performed, make a most desirable ingredient for any air display. There are no Meteor squadrons in B.A.F.O., but Horsham St. Faith supplied an aircraft and pilot for the occasion. F/L. G. J. Lynes, the "guest star" began a memorable act by turning his Meteor into the inverted position almost immediately on take-off; he remained so for several hundred feet of rapid climbing. Ignoring *g*-effect, the pilot retained maximum interest among his audience by keeping the aircraft in their view throughout the performance, except on the one occasion when, after three rolls on an almost vertical climb, the Meteor vanished in a puff of vapour.



Seven Vampire 5s—the R.A.F.'s latest ground-attack fighters—make an impressive slow fly-past with "everything down."

Though nearly all Shooting Stars in service with the U.S.A.F. are doubtless as ornate as those aligned on the Gütersloh perimeter track last week, there was, nevertheless, something familiar about these particular F-80s. One machine, with a painting of a lady named *Fickle Flossie* on its nose, served as a reminder that this squadron—the 22nd—had visited Horsham St. Faith a few weeks ago, where it joined in Exercise *Foil*. The Squadron Commander, Lt. Col. Douglas, led twelve F-80s across the field in an excellent high-speed formation. The unit's aerobatic flight of four aircraft then peeled-off to execute a "Cuban eight"—in which two loops in opposite directions are made, with a 180-deg roll in the latter half of each loop. As if to eccentuate the effectiveness of the combination of powered ailerons and *g*-suits, an individual F-80 broke off to demonstrate very neatly the "inverted vertical reverse," while its three former companions stuck together —almost literally—in rolls and loops, concluding their performance with an upward breakaway in vee formation, more picturesquely termed "bursting bomb" by the commentator.

The "sole survivor" climbs from a bomber-type dinghy to safety aboard the Hoverfly 2 by means of a rope ladder.

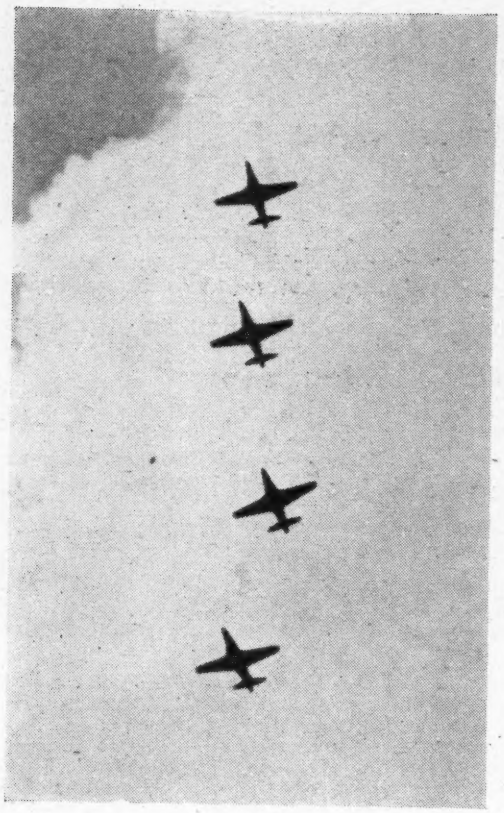
Telephone-cable laying, sea and jungle rescue and casualty evacuation are roles for which the Hoverfly 2 is being experimentally used by the R.A.F. An example of this type of helicopter was present, having made a six-hour trip from England in three stages. The highlight of its demonstration was the "rescue" of a solitary white-clad figure aboard a large rubber dinghy on the airfield.

Warning of approaching raiders was received at this point, and eight Vampire 5s were thereupon scrambled. Meanwhile a training balloon ascended to 7ooft for an exhibition of parachuting by six R.A.F. instructors from Upper Heyford. Their descents were without incident, as all such jumps should be, and three P.J.I.s succeeded in making stand-up landings.

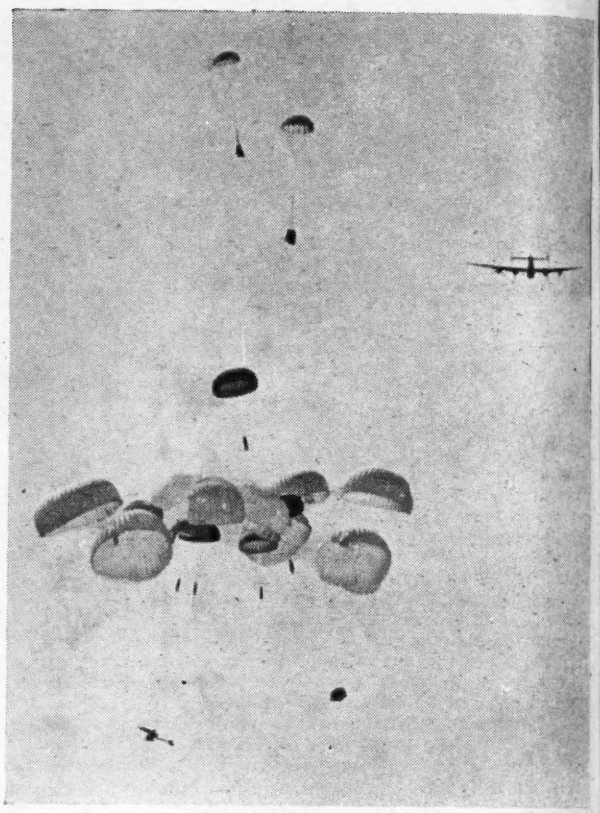
Two raiding formations, each of four Mosquitoes, suddenly appeared at 3,oooft over the airfield. But for each raider there had been a shadowing Vampire, and when almost overhead, the fighters made their attack. Each interceptor had made at least two three-quarter-tail passes before the battle moved out of sight. Two smitten Mosquitoes returned to the airfield and admitted "severe damage" by each discharging a cloud of smoke and a life-like, parachute-borne figure.

Four of the "Vamps." returned to show precision in air drill of a standard which for many months has, among display-addicts, caused reverent pronouncement of the word "Odiham." Unfortunately, full credit cannot be paid to the squadron so well represented; only the fact that it forms part of B.A.F.O. squadron may be repeated. S/L. C. A. McFie, D.F.C., was the soloist. A perfectly spaced formation fly-past by seven Vampire 5s, with flaps and wheels cutting knots to a minimum, brought the afternoon's aerobatics to a neat conclusion.

Departure of a camouflaged Auster 5 was the Army's cue



Visitors from Fuerstenfeldbruck : aerobatic F-33s of the 22nd Fighter Squadron, U.S. Air Force.

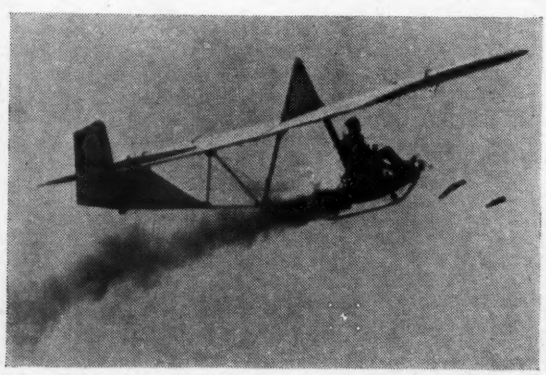


Eight containers, a gun and a jeep descend from a close-support Halifax amid a cluster of canopies.

B.A.F.O. Air Show . . . . .

for action. To illustrate the valued assistance of their airborne observation post, four 25-pounder guns began to fire on the set-piece—a large and fairly substantial-looking "factory" on the airfield. The first rounds were deliberately short, but it was quickly evident that the Auster had the situation well under control.

With the arrival of eight Mosquito FB-6s the attack was now in full swing. From two formations of four, the Mosquitoes peeled-off very snappily and dropped what appeared to be 250-lb bombs. More than half of the missiles fell well within the target area, and the floor-area of the factory became less than superficial. Another batch of Mosquitoes—B34s—swiftly followed up the dive attack by low-level, very precise bombing. What remained of the target was shrouded in white smoke—much of the spectators' enclosure had suffered likewise—by the time 12 Vampire 5s appeared for the final exposition of ground attack. The sound of a dozen Goblins at high r.p.m., plus the intermittent detonations of 25-lb practice bombs—each fighter carried eight—proved to be impressive to a degree. Simulated rocket-assaults, with low, jinking getaways to fox hypothetical flak, marked the jet fighters' departure.



An S.G.38 primary glider of the B.A.F.O. Gliding Club demonstrates its own version of the Jato take-off.

Representative of the Airborne Forces were the Dakota, Halifax and Hastings which brought men and equipment to deal with the charred remains of the set-piece. In commendably quick succession, ten paratroops were disgorged from the Dakota, 20 R.A.F. instructors from the double doors of the Hastings, and a mass of equipment from the Halifax—discernible as eight containers, a gun and a jeep. Four 60ft canopies retarded the two heavier items. Discarding their parachutes, the jumpers made their way towards the hazy skeleton of the short-lived factory, while Dakota-Hadrian and Hastings-Hamilcar combinations were separated, the two engineless aircraft naturally landing first. The Hamilcar appeared to "taxi" to the side of the airfield and, after some delay, a bulldozer emerged from it nose. More hurried activity was present in the vicinity of the Hadrian. The customary "goal-posts" were set up and, with the absence of delay which had characterized the entire programme, the Dakota returned to snatch the glider—and conclude the display.

The A.O.C.-in-C., B.A.F.O., Air Marshal T. M. Williams, afterwards addressed pilots in the briefing room. "Flying discipline," he said, had been magnificent. All who watched and enjoyed the excellent display will echo his words. It was, perhaps, the nearest approach to the atmosphere of the pre-war R.A.F. displays that the Service has made in recent years. R. J. B.

THIRTY YEARS AGO

—*the Daily London-Paris Air Service was Inaugurated : the Work of the Pioneer Operators*

Illustrated by "Flight" Photographs

ALMOST casually (for it was not unexpected) the inauguration of a daily London-Paris service was announced in *Flight* of August 28th, 1919, yet that was the beginning of commercial aviation as we know it to-day. Two Airco machines belonging to Aircraft Transport and Travel, Ltd., had flown from Hounslow and another had flown from Paris on August 25th. The first, an Airco 4 (D.H.4a) left at 9.10 a.m. piloted by Lt. E. H. Lawford and carrying Mr. G. M. Stevenson-Reece, of the *Evening Standard*, as well as a full load including a number of daily newspapers, a consignment of leather from a London firm to one in Paris, several brace of grouse, and a considerable number of jars of Devonshire cream. That aircraft landed at Le Bourget at 11.40 a.m. The second machine, an Airco 16, piloted by Major Cyril Patteson and carrying four passengers, left at 12.30 p.m. and landed at Le Bourget at 2.45 p.m. The inaugural service in the opposite direction was made in an Airco 4a flown by Lt. J. McMullin and left Paris at 12.40 p.m. with Lt. Lawford and Mr. V. M. Console of the *Daily Mail* as passengers.

The Handley Page regular service did not start until a week later, but a preliminary flight was made also on August 25th. That machine started from Cricklewood at 8.20 a.m., called at Hounslow to clear Customs and left again at 9.20 a.m., landing at Le Bourget at 1.15 p.m.—the route was not mentioned, neither have we been able to trace any complaint of prolonged stacking over Le Bourget to account for the long flight.

The first A.T. & T. flight was recalled recently by "Bill" Lawford who, incidentally, is now living in retirement in the Channel Islands. "It was a grim morning," he said, "with heavy rain and practically no visibility." His doubts about the advisability of starting were not relieved by the distinctly odd weather report from Le Bourget which read, "Bolsoms in the Channel and scraggy"—about which somebody remarked that, whatever "bolsoms" might be, it was about time the minesweepers had cleared them all up. The forecast was eventually translated as meaning squally conditions over the Channel, and Lawford decided to set off. The single passenger was squeezed into his seat and a glass lid was closed and screwed down on top of him so that he had to remain in a very uncomfortable position until released from captivity on arrival at destination.

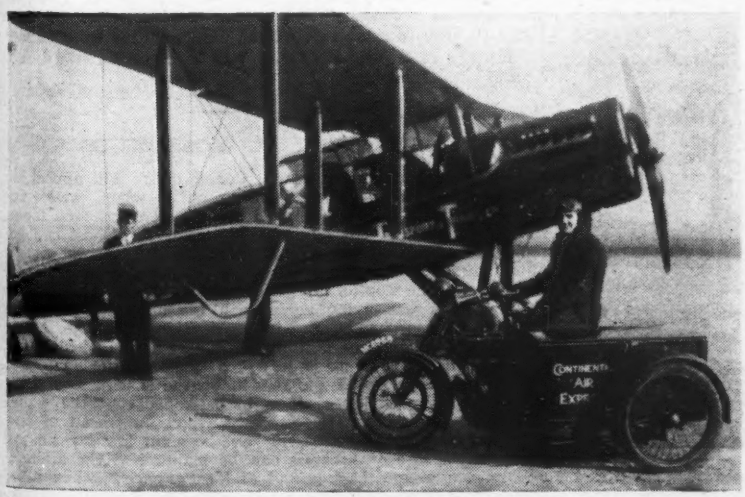
Lt. Eric ("Bill") Lawford in the D.H. 4a (Rolls-Royce Eagle) with which he inaugurated the London-Paris service 30 years ago.

Conditions were sticky over the outskirts of London, and with his compass "swinging constantly through 45 deg," Lawford hedge-hopped all the way to the coast. Over the Channel he flew at "no feet," narrowly missing the Varne lightship, but visibility began to improve towards the French coast. On landing at Le Bourget, he and his passenger were met by a crowd of enthusiastic French officials and one member of the *gendarmerie* who rushed up and kissed him on the cheek with the words: "Allo mon vieux, bien fait. Votre passport s'il vous plaît. Par ici pour la Douane." How little have those "customs" changed!

Passenger comforts

In an earlier announcement of the new service, the Airco 4a was described as a two-passenger machine fitted with comfortable seats and tables and with a certain amount of room for baggage. Passengers would be covered-in from the wind, could travel in their ordinary clothes and read and write, play cards or do business on the way over. The fare for the single journey was 20 guineas and the parcel rate was 7s 6d per lb, scaling down to 3s 6d per lb for anything over 1 lb. After three weeks, A. T. & T. had flown more than 10,000 miles on the London-Paris service, carrying passengers and parcels and with only one ten-minute delay due to a forced landing. Out of 42 possible flights, 41 had been made—a surprisingly high regularity. Handley Page Transport, Ltd., had by this time become fully established on the same route and during the week ending September 12th, 1919, 40 passengers and 1,200 lb of freight were carried between London and Paris at an average time for the journey of 3 hr 29 min.

Developments to assist regular flying went ahead and at the beginning of October, 1919, the Air Ministry announced that wireless communications had been established between the civil



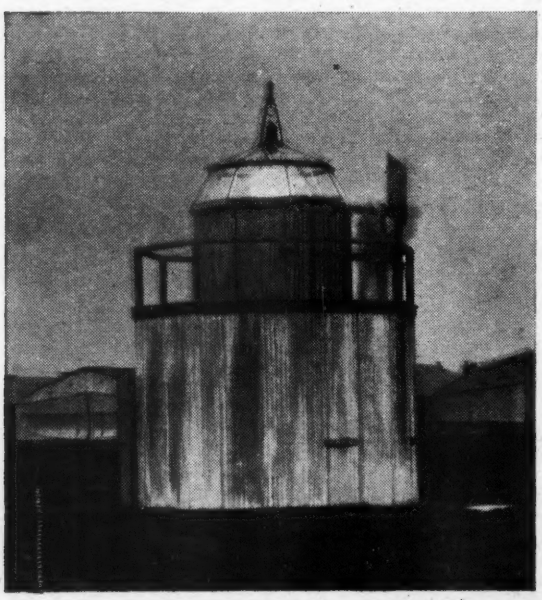
In 1919 a motor cycle with box sidecar could handle the goods carried.

Thirty Years Ago . . . . .

airfields at Hounslow and Le Bourget. Messages could be transmitted between 6.45 a.m. and 7 p.m. G.M.T., but wireless communication on that route was only available for messages regarding the arrival and departure of aircraft, weather reports and urgent messages asking for assistance, etc. In December it was announced that an improved wireless-telephone installation was to be placed on the roof of the seven-story building in Westminster which was then the headquarters of A.T. & T. It would then be possible to receive messages from pilots while they were actually in flight between London and Paris. As a result of this development, there was installed at the head offices of the company in London a special map of the Continental routes on which small model aircraft were moved to indicate their actual positions as shown by the messages the pilots sent. In November the same year, official international mail carrying was inaugurated by flying mails to Paris on the same regular scheduled service. A photograph published on November 13th shows an official proudly exhibiting a Government pennant bearing the legend "Royal Mail" attached to the rudder of an Airco 4a.

There were, of course, some incidents, and on October 29th, while piloting a relief machine from Paris, Lt. H. Shaw was compelled, owing to adverse weather, to come down in mid-Channel. He alighted alongside a small coasting steamer which took the pilot and his passenger on board and also salved the express parcels. The account states that the flotation gear, as fitted to all Airco machines, proved reliable in a very rough sea in its first practical test, though it was found impossible to salve the machine.

It was not long after regular services on the London-Paris route were established that *Flight* referred to "unreliability" as being the chief criticism levelled against commercial aviation. The first objection at that time was the "breakdown of aero engines," which resulted in forced landings, sometimes far away from other means of locomotion and always causing delay to passengers and goods. The second objection was the fact that weather sometimes prevented flying altogether. Yet, continued the article, there were others besides *Flight* who were of the opinion that at that stage of development a commercial air service *could* be run not intermittingly but regularly. That was regarded then as the all-important feature of the London-Paris service, since such high regularity had in fact been



Sole flying aid: The Hounslow occulting lighthouse, which was switched on by prior arrangement or "if a machine was heard".

Another early pilot: Lt. H. ("Jerry") Shaw poses for a photograph while his four passengers alight from the D.H. 16a.

achieved. After over a month's proof of regular running, *Flight* claimed that regular air transport had arrived—the whole question was thought to be chiefly one of organization and the start which had already been made was distinctly promising. Those responsible in the Holt Thomas (A.T. & T.) and Handley Page concerns were given the greatest credit. H.P. statistics for the first seven months' operating (May 1st-November 19th) with their H.P.0/400s were as follows: passengers carried, 3,932; freight carried, 33,901 lb; mileage flown, 56,180.

Since the British London-Paris services in 1949 are flown from Northolt, it is of some interest that on July 3rd, 1919, it was announced that the Central Aircraft Co. had started work at their new aerodrome at Northolt, catering for the ever-increasing demand from the public for joy flips. On the first day, two- and three-seater Avro biplanes with 110 h.p. Le Rhone engines were used, and in spite of bad weather Mr. Herbert Sykes and Lt. Castleman were kept quite busy flying visitors until well into the evening.

On the same day that the London-Paris service was inaugurated 12 representatives of six companies (of which two only had commenced operations) met at The Hague and formed an association which was later to become I.A.T.A. Invitations to that original meeting were issued by George Holt Thomas, who was then president of Air Travel and Transport, Ltd. R. P.

COMET TESTING CONTINUES

A NEW attribute of the D.H. Comet which will appeal to operators was demonstrated recently when, after 26 hours of flying, the four Ghost turbojets were removed for a routine inspection: cowled-up to recowled, the Ghost can be replaced in the Comet in one hour. This suggests the possibility, should it ever prove necessary, of a power-unit change during a routine stop on, say, the Empire routes.

The Comet was flying again with the minimum of delay after the engine change, and it has now done over 30 hours. Speeds and altitudes are slowly being increased; it will be remembered that the machine had already attained 37,500ft and a true air speed of 450 m.p.h. by the time it had completed 20 hours' flying. It is to be hoped that the many months of testing and development which lie ahead of the Comet will be as incident-free as have been the first few weeks. If the rapid rate of progress can be maintained the aircraft will have a unique background of "experience" when it is ready to be introduced into service some two years hence.

WEEK-END EVENTS IN THE WEST

Exeter At Home and Thruxton Races

"Flight" photographs.

(Top) Allen Marsh brings the Cierva Skeeter down the runway for his skilful ring-picking-up demonstration. Thruxton handicap entrants of familiar type are seen in the foreground. (Right) Commentator's (S/L. Doran-Webb) view of the competitors' park and airfield from his control tower post. (Left) S/L. Leslie Cliff, pre-war King's Cup competitor and winner of two closed-circuit Auster races on this occasion, is congratulated by his family.

NUMBER 10 R.F.S. at Exeter received good support for its "At Home" last Saturday. No. 27 Reserve Centre, Exeter, and 21 Reserve Centre, Plymouth, also co-operated in the organization, and the presence of the Secretary of State for Air, Mr. Arthur Henderson, the A.O.C. No. 62 (S.R.) Group and the Mayor of the City and County of Exeter, added importance to the occasion. The flying programme included a Lancaster (complete with airborne lifeboat) which apparently anxious to get things going, arrived ahead of schedule followed by a Reserve formation of Tigers (F/O. Mares, Plt. 2 Dare, and Plt. 2 Pinn). After these Reservists had shown their skill, S/L. Miller, C.F.I. of No. 12 R.F.S. (Bristol) and S/L. Turner, C.F.I. of No 10 R.F.S., respectively showed how skill can be applied to aerobatics and—in hectic crazy flying—how it is best *not* applied. The Navy then took over, when two Hornets and a Vampire from Culdrose were demonstrated. The formation aerobatics by the pair of Hornets, and their upward rolls with "one feathered," were brilliant and thrilled everyone. Gliding, followed by a demonstration, including loops, by the Chrislea Ace (D. Lowry) and a good exhibition by S/L. Twyman of Panshanger in a Chipmunk brought the programme up to the last event—more Tiger formation (S/L. Turner, F/O. East, F/O. Lee).

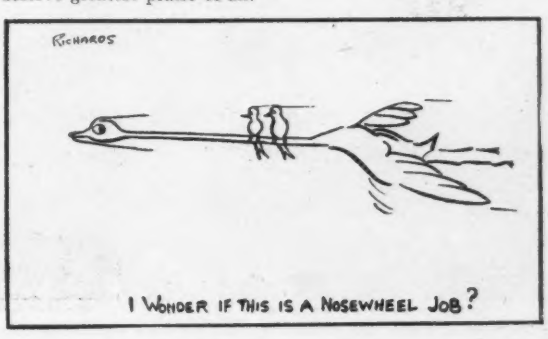
THRUXTON

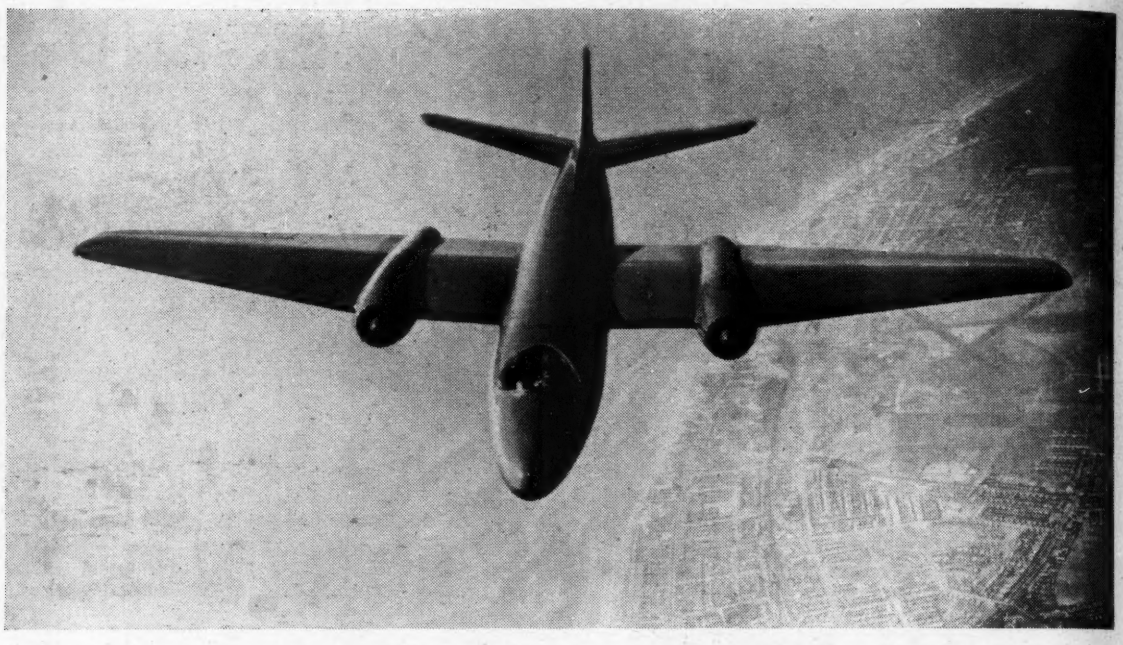
WILTSHIRE Flying Club, together with the Royal Artillery Flying Club, was favoured by wonderful weather and an excellent public attendance for its Thruxton Air Races and Display. A very lengthy programme was planned, including three different Auster Races (Is, Vs and Autocrats) around a good course visible at all times to the spectators. Four laps totalling 20 miles were flown in each case. The events would have been more interesting if flown concurrently, and the four, two and two entries respectively would not have caused dangerous congestion. The main race to Totland Bay, I.o.W., and back, a distance of 75 miles, for the Wiltshire School's Trophy, was a handicap event which received an excellent entry of 23 aircraft, including several King's Cup competitors. The winner was D. Jemmett of Wolverhampton in a Magister. Tommy Rose was a good second in the Cygnet, and F/L. Thompson in another Magister was third. The Sparrowhawk, Speed Six, Dragonfly, M.28 and Gemini were unable to cope with their handicaps and were several seconds behind the winning bunch. A one-class race for Magisters around the airfield course produced good racing, but Ron Paine was too good in his smart red machine and won the Shaw Porter Cup fairly comfortably from Turnhill (2) and S/L. Cliff (3). The latter had previously won both the Royal Artillery Club's silver cup and the cup presented by Mrs. Naylor Young in the Auster races.

Between races an unusually enthusiastic public saw Porteous perform as well as usual, aerobating the "swivelling" Autocrat; Jennings in an Eon Olympia; an Army R.6 helicopter; and a particularly neat display by Allen Marsh in the Skeeter. Gwynne-Johns, now 39 years old, made his 58th delayed drop, and a 38 Group Dakota cast-off a Horsa, which landed its keen "Terrier" crew with jeep and gun on the airfield.

Not until 6.30 p.m. did the high-speed events start with some nicely judged, if dicey, flying by a Spitfire piloted by F/L. Hibbert. He dived very low over the crowds, apparently quite unperturbed by the proximity of more than one inconsiderate Auster that took off and buzzed about on the circuit during the event. The promised Vampire did not materialize at the specified time. Miss Simmonds was announced winner of the arrival competition.

Looking back on a long, hot Sunday afternoon, the excellent and untiring efforts of the Band of the Royal Artillery perhaps deserve greatest praise of all.





On an early outing for the camera, the Canberra is airborne over the coastline of Lancashire—its "home county." Evident in this head-on view are the new jet bomber's very clean lines and low aspect-ratio wing.

English Electric Canberra

Details of the First British Jet Bomber

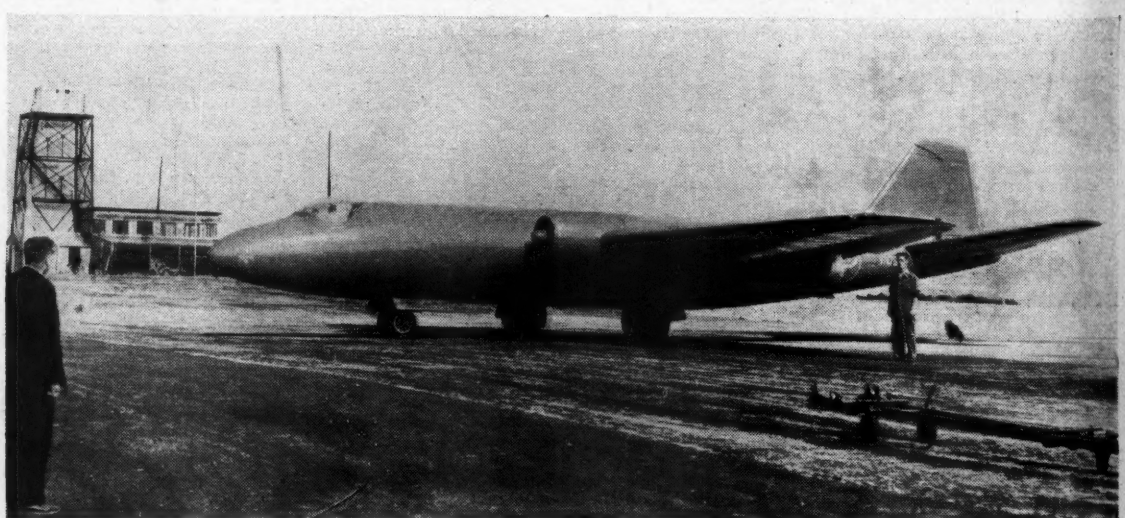
(Illustrated by "Flight" Photographs)

AT the forthcoming S.B.A.C. display at Farnborough it will be seen how extensive has been the past year's progress with British civil and military aircraft. In the latter category, no one machine is likely to compel more attention than the English Electric Canberra B Mk. I.

Concerning this aircraft—Britain's first jet bomber—some information has now been released, augmenting the bare announcement of the Canberra's existence, and the two photographs which followed its 20-minute first flight, in the hands of W/C. R. P. Beamont, D.S.O., D.F.C. on May 13th.

The Canberra is described by the official statement as a high-altitude, high-performance bomber, powered by two Rolls-Royce Avon axial-flow turbojets. Structural design and aerodynamic shape have been evolved for the "attainment of high Mach numbers." Flight tests have confirmed the low drag values.

The accompanying *Flight* photographs of the Canberra give an indication of its aerodynamic refinement. Except for a whip aerial, an unobtrusive tail-skid, and, to a slight degree, the low-drag, one-piece cockpit canopy, not a single

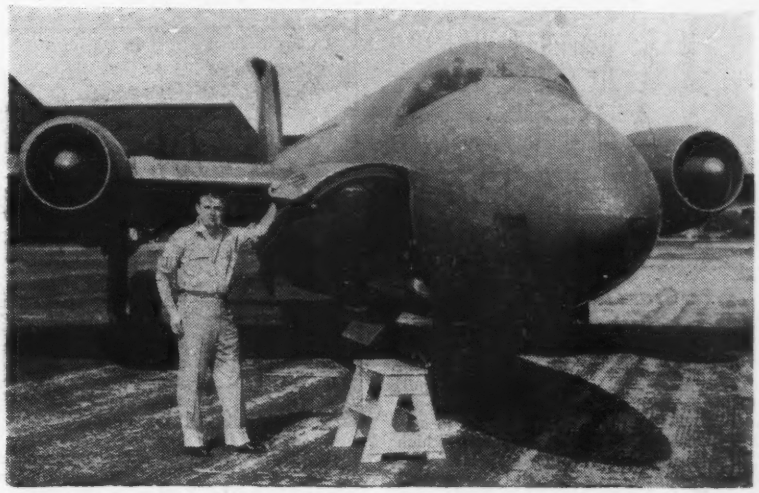


Pictured at Warton, the English Electric Company's airfield near Preston, the Canberra is seen to retain its graceful appearance on the ground.

excrescence is visible on the smoothly tapered circular-section fuselage. Intersection between wing, fuselage and nacelles has been achieved without recourse to fillets.

The Canberra has a wing-span of 65ft 6in and a length of 64ft. Its height is 15ft 7in and the aspect ratio is 4.3. A small degree of dihedral is apparent in the wings, and the low-set tailplane, which has greater dihedral, probably to keep the surfaces clear of the jet efflux, is slightly swept back.

No details are given of performance, armament, or crew capacity, but a study of exterior views suggests that the Canberra may follow the Mosquito principle of relying entirely on speed for protection. There are certainly no visible indications that guns have been fitted. As in the D.H. bomber, the crew seems likely to consist of two members only. Aft of the cockpit there are apparently no crew positions and the remainder of the fuselage is probably taken up by fuel tanks and bomb stowage.



W/C. R. P. Beamont, D.S.O., D.F.C., chief test pilot of English Electric, Ltd., is in charge of the Canberra flight-test programme. The flush fuselage-door is of ample area.

Although there are no indications as to the all-up weight, the Canberra appears to have a moderate wing-loading, which would enhance handling characteristics at high altitude. High speeds—certainly well over 500 m.p.h.—seem assured by the installation of two Rolls-Royce Avons. At present in a relatively early stage of development, these axial turbojets are among the most powerful in existence.

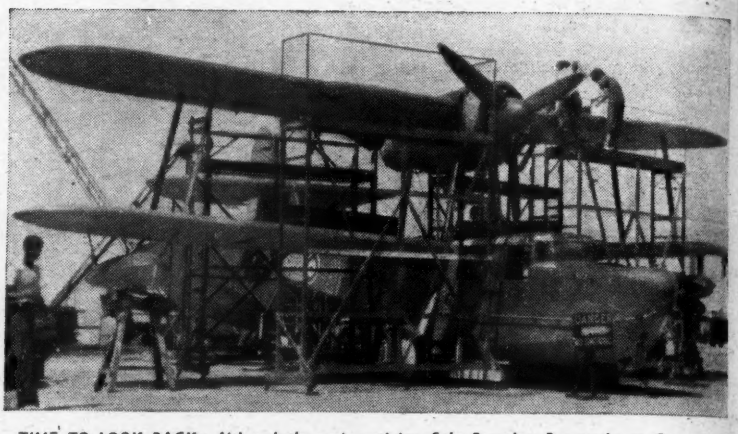
The Canberra's undercarriage is of English Electric design and incorporates single-leg, inwards-retracting main wheels completely enclosed by the inner wing. The coupled twin nosewheels, placed unusually far back, fold rearwards.

Appearance of the Canberra prototype, undoubtedly one of the most graceful ever presented by a British bomber, is made doubly attractive by its glossy, cerulean blue finish.

HANDLEY PAGE HERMES V

Final inspection and checks prior to a first flight were being made on the Handley Page Hermes V last week-end. It is a direct development of the Hercules-powered Hermes IV and is the largest turboprop-powered transport. The four Bristol Theseus power units produce more than 10,000 s.h.p. and will give a cruising speed of between 325 and 350 m.p.h. at 30,000 feet. Initial rate of climb (with 63 passengers) is calculated at 2,000 ft/min and maximum range with reduced load will be over 3,000 miles.

HERE AND THERE



TIME TO LOOK BACK: Although the main activity of the Saunders-Roe works at Cowes is concerned with construction of the giant "Princess"-class flying boats, the firm continues to service rather older types of aircraft, an example being this Sea Otter amphibian.

Grandad Steps Out

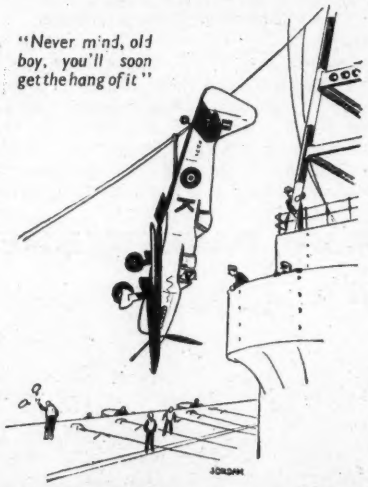
MR. BERNARD MacFADDEN, who is 81 years old, made his first parachute descent—from 2,000ft over Dansville, New York—last week-end. The purpose of the jump was, he said, to prove that "this growing-old idea is all nonsense." For the descent, which he described as "wonderful," Mr. MacFadden wore an American-type football helmet, and shin-guards.

"Wavy" Squadrons at Sea

FOLLOWING No. 1832 Squadron's recent spell of training aboard H.M.S. *Implacable*, the three other air squadrons of the R.N.V.R. are to embark in the carrier *Illustrious* for their first post-war "camp" at sea. No. 1830 Squadron, from Abbotsinch, will embark in the carrier in the Clyde on August 31st, remaining aboard for ten days; 1831 Squadron, Stretton, and 1833, based at Bramcote, will join the ship on September 21st at a southern port.

Race Results Amended

TO its official list of the results of the National Air Races (published in *Flight* of August 11th) the Royal Aero Club has announced certain corrections. The speeds of W. Breen-Turner and J. Findlay in the second heat of the King's Cup Race, originally given as 131 m.p.h. and 126.75, are now stated to have been 128.25 m.p.h. and 131 m.p.h. respectively. In the third heat, G. H. Pike, and not Ian Fossett as stated, flew the D.H. Dove. In the inter-squadron R.Aux.A.F. race, the speed of 215 m.p.h. credited to F/O. J. Baxter (Spitfire 22) was exactly 100 m.p.h. too slow.



"Never mind, old boy, you'll soon get the hang of it"

Canadian F-86 Contract

IN conformity with a policy of avoiding dependence upon any single overseas source for military equipment, the Royal Canadian Air Force has placed a contract for 100 North American F-86 Sabre fighters, to be built under licence by the Canadair Company of Montreal. An impending order for some of these jet fighters has been mentioned on a number of occasions, and it has been inferred that they are to replace the 85 Vampires now in service with the R.C.A.F. A better word would be augment, for although the Sabre is faster in level flight, the British-made Vampire has many other operational advantages.

Singapore Air Display

AN air display held at Kallang, Singapore, on Saturday, August 20th, was watched by a crowd estimated at 10,000. One of B.O.A.C.'s *Argonaut*-class Canadian Four airliners—the *Aurora*—was among the aircraft which took part. It was piloted by Capt. Nigel Pelly, O.B.E., a double "mileage millionaire," who recently completed the 26,000 mile Canadair proving flight to the Far East.

During the display, a Gemini was being demonstrated on one engine when that engine cut. The aircraft, which was flown by Mr. Arthur Newark, the Acting Director of Civil Aviation for Singapore and Malaya, was "ditched" in the harbour nearby, but remained afloat and was towed ashore.

DISCUSSING THE BEAVER: The D.H.C. 2 Beaver forms the subject of this conversation between (left to right) G/C. R. C. Jones, R.A.F. Attaché in Washington, Mr. Christopher Clarkson, Britain's civil air attaché in the U.S. capital, and Mr. W. Oswald, Jr., sales representative of the Babb Company, sole distributors of the Beaver in America. The occasion was an exhibition in Washington at which the merits of this sturdy bush transport were displayed.

Sabres Sheathed

TO prevent the closing of production lines by delayed supply of components, the North American Aviation Company has developed its own "cocooning" process for semi-completed aircraft. A shortage of undercarriages for F-86 Sabre fighters, due to a strike at the Bendix plant which supplied them, recently caused the process to be used for the first time.

Fifteen sets of undercarriages were employed to put finished aircraft through flight trials without interrupting production. On completion of testing, the

HERE AND THERE

undercarriages were removed and the Sabres sprayed with an airtight plastic solution pending the arrival of the required parts.

Jetliner Grounded

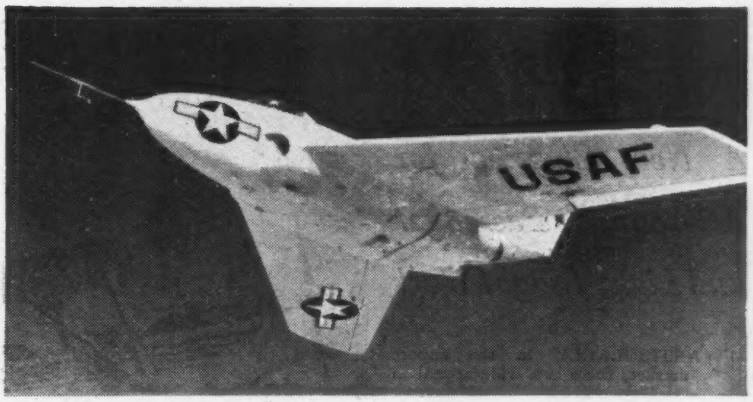
AFTER a belly-landing at Malton airfield, near Toronto, on August 17th, the Avro Canada C-102 Jetliner (illustrated on p. 186 last week) suffered minor damage but, it is reported, should be flying again within a fortnight. For two hours before the touchdown the aircraft circled the airfield with its undercarriage jammed, but the altitude at which this enforced "stacking" took place has not been stated. The Jetliner, which is powered by four Rolls-Royce Derwent 5s, made its first flight on August 10th.

Hellenic Helldivers

FORTY-NINE Curtiss Helldivers were delivered to the Royal Hellenic Air Force by the U.S.N. escort carrier *Sicily* on August 15th. Two had arrived a few weeks earlier and were used to train Greek airmen in their operation. The remainder, equipped to carry bombs and rockets, will be used against fortified rebel positions in the northern Grammos mountains. Although relatively obsolete—the Helldiver first saw service early in the war in the Pacific—this type of dive-bomber should prove to be of considerable assistance to the Nationalist forces.

FORTY YEARS BACK

"Mr. Cody was actively at work again, and this time made several flights with a passenger on board. . . . Mrs. Cody was prevailed upon to accompany her husband for a trip, thus securing the unique honour of being the first lady to go up in an aeroplane in Great Britain. This time Mr. Cody made several turnings and a figure of eight, all the evolutions being carried out splendidly."—*From "Flight" of August 21st, 1909.*



NEARLY BUT NOT QUITE: Speeds in the "high sub-sonic zone"—those just below the speed of sound—present the particular problems investigated by the Northrop X-4 twin-jet research aircraft. Its swept wing has a span of 25 ft and gross weight is 7,000 lb.

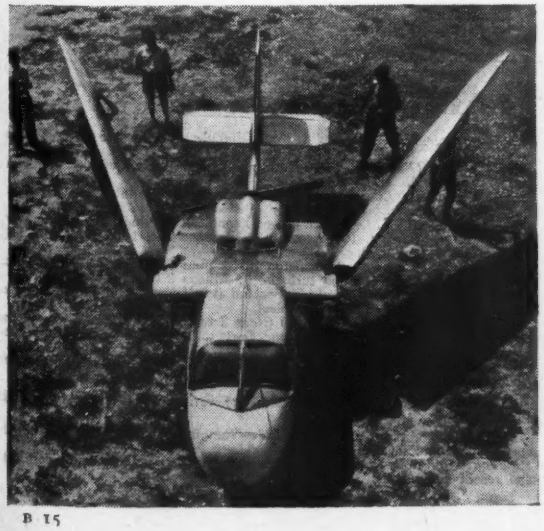
Reservists' Earlier Hours

A RECENT Air Ministry announcement states that "to avoid disturbing people after they have gone to bed, night flying is not to take place at Reserve Flying Schools of the R.A.F.V.R. between 11 p.m. and 7.30 a.m." To give effect to this policy, it continues, some schools are postponing their night training until the nights are longer, so that they can finish flying before 2300 hr.

Any alteration in the time of flying training activities which benefits the public, without decreasing the efficiency of the V.R., is of course desirable. It is to be hoped, all the same, that the value of V.R. training—to which night flying contributes greatly—will not suffer as a result of the new policy.

Employment in the Industry

RETURNS collected by the Ministry of Labour and National Service from its appointments officers in England, Scotland and Wales, show that in the aeronautical and automobile engineering industries, as at June 13th, there were 759 registrants on the books (233 unemployed and 526 employed but seeking a change of employer); vacancies at the same date totalled 44. These figures do not include those in the separate "Technical and Scientific" Register. In a commentary on the returns, the Ministry remarks that the number of air pilots and navigators registered fell from 220 in June 1948, to 41 in June, 1949, and that of those registered on the latter date only nine were unemployed.



AUTOMOBILE ASSOCIATION: Powered by a 120 h.p. pusher Continental engine, this new Pellarini "roadable" light aircraft, which is capable of 120 m.p.h. in the air and 60 m.p.h. on the road, is shortly due to make a tour of European capitals.

News in Brief

A TALK on the uses to which helicopters are being put in England—one of a series of replies to overseas listeners' queries—was given last week by the Editor of *Flight* in a B.B.C. short-wave broadcast.

* * *

Subject to official confirmation, Major Jan Flinterman, of the Royal Netherlands Air Force, on August 15th broke the 11-year-old Dutch altitude record of 37,226ft with a flight to 47,572ft in a Meteor 4.

* * *

The engagement of Miss June Katherine Spencer Spriggs to Mr. James Douglas Howden Hume was announced last week. She is the daughter of Sir Frank Spencer Spriggs, managing director of the Hawker Siddeley Group.

* * *

Details of any privately produced films thought suitable for inclusion in the Third International Scientific Film Congress, to be held in Brussels from September 30th to October 5th, should be sent to the Scientific Film Association, 4, Great Russell Street, London, W.C.1.

* * *

The British Standards Institution reminds exporters that it acts as the United Kingdom representative of all overseas national standards organizations, and can therefore answer relevant queries addressed to its offices at 24-28, Victoria Street, London, S.W.1.

* * *

Mr. William K. Ebel has joined Canadair, Ltd., of Montreal, as vice-president in charge of engineering. He has served in similar capacities with both the Glenn Martin and the Curtiss-Wright Corporations. Mr. Oliver West, Canadair's president, has announced that Mr. Ebel is to be responsible for all the company's design, research and development activities.

* * *

Flight regrets to record the death, which occurred recently in California, of Mr. Chas. L. Burdick, founder (and for many years chairman and managing director) of the Aerograph Co., Ltd., London. The inventor of the first practical air-brush, he was subsequently a pioneer in the design of many types of industrial spray-painting equipment.

VERSATILE SUPER ACE

A New Chrislea for All-round Passenger and Light-freight Work

An artist's impression of the new Chrislea Super Ace. A tailwheel undercarriage is now fitted.

PARTICULARLY in the export market, there is a wide appeal in the "go-anywhere" small aircraft which is not limited to purely passenger-carrying duties, but which can alternatively carry a useful load of cargo—consisting, on occasions, of the most unlikely and awkward objects. In this country, too, such an aircraft should find plenty of use in newsreel, agricultural, survey, ambulance and other utilitarian duties.

Appreciating these facts, the makers of the Chrislea Super Ace (Chrislea Aircraft Co., Ltd., Exeter Airport, Clyst Honiton), have executed a highly original re-design of their Series 2 cabin four-seater. Known as the Series 4, it is to make its first public appearance at the S.B.A.C. Show.

Although now modified in a number of respects, in basic form it remains a four-seater. However, it can very quickly be converted—seven minutes is the time claimed—into a small freighter capable of flying a payload of 700 lb for over 500 miles.

The transformation is made by removing the rear seats and front passenger seat, whereby an unobstructed 75 cu ft of freight space becomes available. Long or similarly awkward items—up to 14ft in length—can be accommodated without difficulty by virtue of the fact that the whole length of the rear fuselage decking, from cabin to tailplane, hinges forward and up for loading; the long loads can be lashed to the top of the rear-fuselage main section and are completely enclosed when the decking is lowered.

This loading arrangement gives the Series 4 Super Ace obvious possibilities as an ambulance, and for this requirement a conversion time of 12 minutes is specified: stretcher-rails are fitted from the front spar to the rear-fuselage bulkhead and a small seat for the medical attendant is installed behind the pilot's seat.

Reverting to the passenger version, a further innovation is that two additional occasional seats for children of up to 50 lb weight each may be installed by utilizing the luggage compartment—which, incidentally, has been doubled in size as compared with that of the Series 2 aircraft. Unlike its predecessor, which is powered by a 130 h.p. D.H. Gipsy Major, the Series 4 has a 155 h.p. Cirrus Major 3.

Other cabin refinements include improved instrument panel layout and more commodious front seats.

The machine is to be sold with built-in electrical starting and lighting equipment; the standard tankage has been increased to provide fuel for 530 miles; and an extra tank to extend the range to 800 miles may be accommodated in the luggage compartment.

DIMENSIONS

Span	36ft
Length	21ft 6in
Height	7ft 3in

WEIGHTS

	lb
Passenger carrying :	
Weight empty	1,540
Fuel	280
Oil	34
Pilot and payload	646
All up weight	2,500lb
Freight carrying :	
Weight empty (as above, minus removable seats, etc.)	1,485
Fuel and oil	314
Pilot and payload	701
All up weight	2,500lb

PERFORMANCE (Sea Level)

Max speed at sea level	130 m.p.h.
Cruising speed at sea-level (2,200 r.p.m.)	110 m.p.h.
Stalling speed (flaps down)	54 m.p.h.
Max rate of climb at sea-level	600 ft/min
Take-off (5 m.p.h. wind)	150 yd
Landing run (braked, 5 m.p.h. wind)	130 yd
Service ceiling	14,000ft
Range (still air)	530 miles

TO BE SHOWN AT FARNBOROUGH

THE S.B.A.C. has issued the following list of aircraft which are to be exhibited by their makers at Farnborough. Those machines which will be shown on the ground but will not be demonstrated in the air are indicated by an asterisk:—

Airspeed, Ltd.—Ambassador (two Centaurus).

Armstrong-Siddeley Motors, Ltd.—Avro Lancaster (two Merlins and two Python turboprops).

Sir W. G. Armstrong Whitworth Aircraft, Ltd.—Apollo (four Mamba turboprops).

Auster Aircraft, Ltd.—Autocrat (Cirrus Minor 2); J/5.B (Gipsy Major); Mk. 7 (Gipsy Major 10); Avis (Gipsy Major 10).

Boulton Paul Aircraft, Ltd.—Balliol 2 (Merlin 35).

Bristol Aeroplane Co., Ltd.—Wayfarer (44-seat version, two Hercules); Helicopter Mk. 2 (Leonides).

Chrislea Aircraft Co., Ltd.—Super Ace (Gipsy Major 10); *Super Ace (Gipsy Major 10).

Cierva Autogiro Co., Ltd.—Skeeter 1 (Jameson); *Skeeter 2 (Gipsy Major 10); Air Horse (Merlin).

De Havilland Aircraft Co., Ltd.—Comet (four Ghost turbojets); *Sea Hornet 22 (two Merlins); Dove (two Gipsy Queen 70s).

De Havilland Aircraft Co. of Canada, Ltd.—Chipmunk (Gipsy Major 10).

English Electric Co., Ltd.—Canberra 1 (two Avon turbojets).

Fairey Aviation Co., Ltd.—Firefly 5 with Ratog (Griffon).

Gloster Aircraft Co., Ltd.—*Meteor 4 (two Derwent turbojets); *Meteor 7 (two Derwent turbojets); Meteor 8 (two Derwent turbojets).

Handley Page, Ltd.—Hermes 4 (four Hercules); Hermes 5 (four Theseus turboprops).

Handley Page (Reading), Ltd.—Marathon 1 (four Gipsy Queen 71s); *Marathon 2 (two Mamba turboprops).

Hawker Aircraft, Ltd.—P.1052 (Nene turbojet); N.7/46 (Nene turbojet); *Fury Trainer (Centaurus); *Sea Fury 11 (Centaurus).

Percival Aircraft, Ltd.—Prince (two Leonides); *Prince (two Leonides); *Prince (Survey Version, two Leonides); *Prentice Mk. 1 (Gipsy Queen 31); Prentice Mk. 2 (Gipsy Queen 51).

A. V. Roe and Co., Ltd.—Shackleton G.R.1 (four Griffons); *Athena 1 (Dart turboprop); *Athena 1 (Mamba turboprop); Athena 2 (Merlin).

Short Brothers and Harland, Ltd.—Sealand (two Gipsy Queen 71s); *Sturgeon 2 (two Merlins); Solent 3 (four Hercules).

Vickers-Armstrongs, Ltd.—Type 510 (Nene 2 turbojet); Attacker (Nene turbojet); Seagull (Griffon); Viscount (four Dart turboprops); Varsity (two Hercules); *Valetta (two Hercules).

Westland Aircraft, Ltd.—Wyvern T.F.2 (Python turboprop); S.51 helicopter (Alvis Leonides).

NOTE.—The following aircraft, which are variations of earlier types, will also take part:

De Havilland Aircraft Company, Ltd.—Vampire (Goblin turbojet with jet-pipe reheat equipment).

Sponsored by Rolls-Royce, Ltd.—Meteor 4 (two Derwent turbojets with jet-pipe reheat equipment).

** Will not be demonstrated in the air.*

Illustrated by "Flight" photographs

VISCOUNT in the air

A Glimpse of a New Phase in Air Transport: Handling and Performance of a Turboprop Airliner

No. 32 OF THIS SERIES

BY THE EDITOR

WITHOUT exception, everyone who has been fortunate enough to fly in the Vickers Viscount has landed full of praise for the smooth and silent comfort it offers. It is no exaggeration to say that this intended replacement for the Viking is an exceptional machine which heralds a new phase in air transport. Moreover, the fact should not be overlooked (or obscured by consideration of the particular qualities bestowed by the four Rolls-Royce turboprops) that this Vickers design gives every indication of being a first-class job in its own right, whether powered by gas turbines or piston engines. It is well-known that the prototype is to be followed by an enlarged version, to be called the Viscount 700, of which some details were given in our issue of March 24th last. The increased accommodation is likely to give it wider appeal among operators, to enable it to operate with greater economy, and to take advantage of the much greater power available from later marks of Dart (R.Da3, 1,420 s.h.p.). There is, however, no reason to believe that the behaviour or characteristics of the Viscount 700, with 5ft greater span and 6ft 8in larger fuselage, will differ to any marked extent from those of the first machine.

No prototype has given less trouble during its early stages, and following nearly a year of development and test flying during which some 200 hours of air experience had been gained, the machine was taken into the hangars a few weeks ago for the fitting of pressurization equipment and for a complete inspection of airframe and power units. Much of the testing for grant of a Certificate of Airworthiness had been completed, and now that the aircraft is flying again this work will be completed as soon as possible. Because the earlier tests were carried out with Darts delivering 1,000 s.h.p. each, the present units which have now been type-tested at 1,250 s.h.p. are derated for the completion of C. of A. tests to avoid repeating certain tests at a higher power. In any case, the 1,000 s.h.p. per Dart is quite adequate for the prototype's needs.

It is now eight months since a member of *Flight's* staff was able to give his impressions while flying as a passenger in the Viscount. Last week I was permitted to fly as second pilot to F/L. G. R. Bryce, and to sample the aircraft from the pilot's point of view. Naturally, at this stage, I was not able to handle the machine to the same extent as on the usual "in the air" tests, but some definite impressions could nevertheless be gained by doing some of the flying, watching some more, and comparing notes afterwards. Corporation pilots have done many hours of routine test-flying on the Viscount and are under-

The Viscount pictured in a cloud-setting worthy of its shapeliness. The slim, unobtrusive Darts belie their power potential.

VISCOUNT in the air . . .

stood to be more than satisfied with the handling and performance.

First of my own impressions was of smoothness when starting and running-up. The silence at this stage was unusual, but not remarkable. We started up from port to starboard, and because the ground-starter accumulators were flat the internal batteries were used after port outer had "taken." With the least possible fuss and bother pumps were switched on, each engine selected in turn and the starter button pushed to energise the starting cycle. The prototype carries extra jet-pipe temperature gauges covering the range from 0-400 deg C, at which point the normal dials take over. Cruising temperature is 420-450 deg C; maximum permissible, 550 deg C. From the starboard seat it is not possible to see the port airscrews, and the first indications of a start are the building-up of r.p.m. as shown by the indicators, followed by a flick from the jet-pipe temperature needles. As soon as the turbine is turning, the high-pressure fuel cock is opened (the four fuel cocks are mounted beside the power levers on the pedestal) and the Dart picks up rapidly to about 6,000 r.p.m., its idling speed. The airscrews are at zero pitch for starting.

The flying control lock incorporates a gate for the power controls ("throttles"); this prevents the pilot obtaining sufficient power for take-off if the controls are locked, but permits taxying with up to 10,000 r.p.m. While the remaining Darts were started on internal batteries, the lock was released to obtain 12,500 r.p.m. so that the generators on each power unit in turn should boost the batteries for the next to start.

When all were running and the doors—two unusually large ones for a pressurized hull—closed, we could hear a distant high whine and a faint, deep, muffled rumble. Neither was sufficiently loud to interrupt normal conversation in the cockpit. In the cabin scarcely anything could be heard at all.

The Darts had been run-up earlier, so without delay the nosewheel steering motor was switched on and the brakes released. Controls were locked at this stage. To me, the taxying was at first rather disturbing, for I had no experience of nosewheel steering on medium or large aircraft. With the greatest of ease, and almost nonchalantly, we bowled along the apron at Wisley, round the corner of the hangar to the left, bore right up the slope past trees and a line of parked Valettas, and out onto the grass runway at what seemed like 50 m.p.h. but probably was about 20 m.p.h. The precision of steering and the power of the brakes astonished me and, in spite of the hard, fairly rough ground, there was no discomfort, springing being excellent. Each adjustment with the steering wheel was accompanied by a squeal from the steering motor, clearly audible above all other sounds. For taxying 7,000-8,000 r.p.m. are required—rather less, perhaps, with V.V.I.P.s aboard.

Turning into wind at the end of the runway, a brief cockpit check was made, 15 deg of flap lowered, and then the Darts were all opened wide against the brakes. For the first time it was possible to discern airscrew rumble clearly, but still there was no engine noise (other than the faint whine mentioned earlier) or vibration in the cockpit.

On releasing the brakes the Viscount accelerated rapidly (the weight being only about 38,000 lb) and without any sign of swing. Within a third of the runway length we were airborne, and with wheels up and flaps coming in at their own speed, the climb was so rapid that the needle remained on the 2,500 ft/min maximum reading of the indicator for some thousands of feet. The declared climb with full load at the best speed of 140 kt is 1,800 ft/min. Take-off figures for the Viscount to clear 50 ft at maximum weight are 1,030 yds on four engines and 1,300 yds on three. The 700 will take about 100 yds more in each case, the all-up weight being 48,000 lb compared with 45,000 lb.

Once we were airborne, the fine-pitch-stop override switch was put to off and its small red indicator light went out. The four pale-blue fuel-flow lights remained steady during flight. The fine-pitch stop is withdrawn automatically by a contact on the undercarriage, when there is weight on the wheels, and this permits the pitch to fine-off to zero. For take-off the undercarriage switch is overridden and the flight 22 deg fine-pitch stop comes into operation. The red light warns the pilot to cancel the override switch before landing again. Failure to do so would probably cause excess jet-pipe temperature through trying to idle in too coarse a pitch.

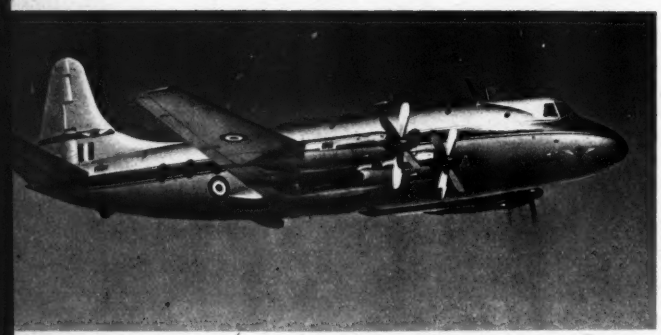
We climbed to 12,000ft above the cloud and there formated with a Valetta flown by W/C. George Lowdell to enable our photographer, L. McLaren, to obtain the accompanying photographs. While we were cruising around I spent a few minutes walking about in the furnished after cabin (the forward cabin now contains the usual test and recording equipment), and was once more astonished by the smoothness of flight in the Viscount. It might be likened to the penetrating, liquid smoothness of a great liner in sheltered water rather than to the light, butterfly movement of a sailplane. It is inaccurate to say, however, that it is silent; exceptionally quiet—yes. No engine noise is apparent, and one can talk easily across the cabin, but there is a just-audible mixture of remote noises. We were not using pressure, although first tests are now being conducted at 4½ lb differential. The system is designed to produce 8,000ft conditions when flying at 25,000ft.

The cockpit of the prototype, comfortable and methodically planned, carries more instruments than will be required on later machines.

Returning to the controls, I decided on looking round this prototype cockpit that everything is handy and neat. The seats are comfortable and have adequate adjustment, and there is plenty of room. I have been in cockpits from which I could see more, but do not think the size of the windows would come in for much serious criticism.

While I was flying, F/L. Bryce tried the now well-known demonstration of balancing a half-crown on its edge; in this case he did it on the control pedestal (instead

Pressurization explains the presence of the new ventral scoop.



Twelve thousand feet above the fields of Sussex, the Viscount's pilot draws up to the camera (upper view) and, when close beside, feathers his port turboprops. The airscrews do not stop entirely.

VISCOUNT in the air . . .

of on a cabin table) through which vibration might be expected if any had been present. Not only did the coin remain on edge for some minutes, but I was able to make a turn of just over 30 deg bank before it fell.

I did not try stalling, but understand that it is normal and is heralded some 7 m.p.h. in advance by mild buffeting of all control services. (Incidentally, all the controls are metal-covered, the ailerons being in two sections locked together). With the full 57 degrees of flap, and power on, the stall becomes rather abrupt if the aircraft is held into it. However, the speed is then remarkably low and one could scarcely get into the condition unintentionally. The maximum wing-loading of the Viscount is 50.8 lb/sq ft; of the 700 it will be 49.8 lb/sq ft.

The Viscount is remarkably stable and boasts as nice a pair of ailerons as one could wish. They are most responsive, particularly at approach speed, even though they become pleasantly light. Centering action is pronounced.

If two engines are cut suddenly on one side, a touch of aileron and rudder keeps the aircraft straight without any effort at all. There is considerably less apparent effect than one gets with most fours on throttling back an inboard engine alone. As may be judged from the photographs, Mr Bryce was able to formate confidently on the Valetta at 12,000ft and 140 kt I.A.S. with two Darts feathered on one side It is a characteristic of turboprops that, when one closes the single power-control, pitch-change leads and momentarily, till r.p.m drop, an acceleration is felt. The reverse is true also This is not conducive to good formation flying until one gets used to it. A very large number of successful and immediate relights have been made with Darts at altitudes from sea-level to 25,000ft. The solitary failure was caused by a faulty igniter plug Relighting drill consists simply of "blipping" the unfeathering button and then opening the high-pressure fuel cock.

An hour passed by very quickly in the Viscount, and the crew at once confirmed my impression that normal fatigue is appreciably reduced by the absence of vibration and noise. I was allowed to "play" as we made for Wisley (which is surely the most attractive of manufacturers' airfields), and, finding a large gap over Epsom Downs—recognized from high up by the race course—I dived the Viscount quite steeply with Darts throttled back from the cruising 12,500 to 10,000 r.p.m. until about 260 kt I.A.S. were registered. There was no undue tightening-up of controls, and it required little effort to pull her round at this speed in as tight a turn as an airliner should ever be expected to make. Cruising r.p.m. are a matter of choice or decision by the operator, up to 13,750 r.p.m. being permitted for continuous operation of the Darts. Maximum for 5 min running is 14,500 r.p.m.

Back on Wisley circuit, F/L. Bryce took a little time to induce the knots to fall off, but showed me that the flaps have been specially stressed up to 15 deg angle for use at any air speed to aid in this matter. There is no trim change of note when wheels and flaps are lowered, and the aircraft approaches comfortably and with lively controls at 110-120 kt. Over the hedge less is acceptable at normal landing weight. Although we approached steeply, the round-out gave no trouble at all, and to quote Mr. Bryce, the aircraft "sits down like an old lady". This familiar piece of pilot jargon may, in this instance, be taken to mean that the Viscount sinks gently on to its main wheels, slightly tail-down, for touch down, and then, rocking forward on to the third wheel, stays put. The powerful brakes will pull her up very rapidly if need be.

The Vickers Viscount is now one of several British gas-turbine-powered airliners, and it has interesting relatives for research in the Nene-Viking, and in the Tay-Viscount at present under construction. It has already set such a high standard that once introduced into service and sampled by the travelling public it cannot fail to attract passengers from the existing types of aircraft which it outmodes in such a pronounced manner.

No announcement has been made regarding orders for the Viscount 700, but Lord Douglas, B.E.A. chairman, said recently that his Corporation were considering ordering them for the London-Belfast service. There is little doubt that an order will be forthcoming in the near future if, in fact, it has not already been provisionally placed, and for many reasons it is regrettable that the announcement of an order has been delayed for so long. As it is, at least 2½ years must elapse before Viscounts could be built and put into service. Perhaps a delay of this sort would have been inevitable for, good as they have proved to be, Dart turboprops are still very new, both as a class and an individual design for use in passenger transports, and a great deal of experience, development work and research for increased economy and period between overhauls is still required. It is calculated that the Viscount 700 will give 1.45 a.m.p.g. cruising at mean weight at 25,000ft. The speed would be 327 m.p.h.

Increasing numbers of important visitors to Weybridge from the Continent and across the Atlantic are a sure sign that the Viscount's fame has spread and its unique qualities are being recognized. With the aid of such aircraft, this country prepares to take the lead in both the design and the production of aircraft for the world's routes.

DATA for the VISCOUNTS

	Prototype	Viscount 700
Span	89ft	94ft
Length	74ft 6in	81ft 2in
Height...	26ft 9in	26ft 9in
Track	21ft 1in	26ft 1in
Wheelbase	21ft 5in	24ft 9in
Wing Area	885 sq ft	963 sq ft
Max a.u.w	45,000 lb	48,000 lb
Max Wing L ding	50.8 lb/sq ft	49.8 lb/sq ft
Fuel Capacity	1 200 gall	1,400 gall

Russia's Jet Progress

German Brains Picked : Heaven-sent Nenes : Interest in the Ju.263

DURING 1948 the author of these notes quit the Russian Zone, where he had been studying German technique on behalf of the Soviet Government, and placed himself in British hands. His observations are here presented with a minimum of sub-editing, and although they add little to present knowledge of Russian technical development (and, in fact, conflict in certain respects with well-substantiated information), when read in conjunction with the same author's article in *Flight* of May 12th they throw new light on the Russian mentality. Lt. Col. Tokaev is not fully informed on the characteristics of Russian jet aircraft, and it will be noted that the Yak-15 is described as having two jet units, whereas photographs indicate that only one is fitted. Again, the statement that the U.S.S.R. does not have any jet-propelled bombers would, we believe, be more accurate if qualified by the words "in service."

Reference is made to Russian rocket-propelled aircraft tested during 1943 and to Soviet interest in the Ju.263 rocket-powered intercepter, developed by the Junkers staff from the Me.163 operated in the late months of the war.

ASK any Soviet citizen of Russian nationality and he will tell you that the birthplace of jet propulsion is Russia, and that the first successful inventors in this field have been Russians. The person of Konstantin Eduardovich Tsyolkovsky is being extolled in every possible manner as being the founder of jet flight. To spread this racial-propagandist psychology, I am sorry to say, some articles written by the author of these lines have been used, although he had never meant to write them for this praiseless purpose.

In reality, jet and rocket technique, in a form more or less practically applicable, became known in Russia only on the eve of the First World War. Thanks to the further researches by Tsyolkovsky, Rynin and other Russian scientists, the Soviet ideas on jet propulsion advanced theoretically, but they never reached the level of the achievements outside Russia, and especially those of the Germans. At the beginning of the war there was not a single jet- or rocket-propelled aircraft flying in the U.S.S.R. The only practical achievement was that of Kostikov, a former engineer of the Zhukovsky Air Force Academy, who, working in unbelievably difficult conditions caused by a conservative bureaucracy, created the famous rocket weapon the "Katyusha."

By **Lt. Col. Dipl. Ing. G. A. TOKAEV**

What were the reasons for this backwardness? First of all, the attitude of the ruling circles: there were many projects, but their authors were laughed at. In 1938 the author was derided at the Office of Inventions because he had presented a draft project of a small winged rocket; something similar happened to others. We knew not only about the projects of Tsyolkovsky, Goddard, Obert, Nebel, Ridel, Winkler, Sander Lyon, Max Vale, Cattaneo, Espenlaub, Swan, Crocco, Stipp, and others, but also about the work done by Junkers of Dessau. And yet there still does not exist in the U.S.S.R. a home-produced jet or rocket engine suitable for mass production!

The first and only rocket unit was built by engineer Duzhkin as late as 1942, but its thrust did not, in practice, exceed 500 kg. Around this unit was built the first Soviet experimental rocket-propelled fighter, designed by Viktor Fedorovich Bolkhovitinov, lecturer at the Zhukovsky Academy. Of two aircraft built, one was submitted to flight trials in 1943, but met with an accident and crashed, the pilot being killed. Its maximum duration of flight was, I believe, no more than 7-8 minutes.

Bolkhovitinov was dismissed and has not been allowed to undertake any constructional work since. In 1947, Khrunichev (Minister of Aircraft Production) and Voznesensky (member of the Politburo) said quite tersely that Bolkhovitinov "no longer enjoyed their confidence." Had he been allowed to, he might have produced good rocket-propelled aircraft in the meantime.

During the war, very intensive work, with the aim of producing a jet unit, was carried out by Professor Abramovich's group (Ts AGI), but without any serious practical results. The second Soviet expert on jet propulsion, Prof. Stechkin, has, as already described in a previous article (*Flight*, May 12th, 1949), spent a lot of time in prison and, naturally, has been unable to show any concrete results. None of the others working in the field of jet propulsion is deserving of any consideration.

Because of all this, the U.S.S.R. did not possess any modern rocket or jet unit (and, consequently, no turbojet or rocket-propelled aircraft) towards the end of the Second World War. The German rocket and turbojet aircraft caused alarm among the Soviet rulers, who began to blame Soviet airmen because "rotten Fascism" had achieved more in aviation than the Soviet Union, "the country most advanced in every respect in the world."

When Russian troops entered Germany, it was the first task of the special detachments to look for the plans, models and specialists concerned with rockets and jet propulsion technique. A real "combing out" was organized, and presently German models started to appear in all the U.S.S.R. scientific research and constructional institutions. The "Office of New Technique" and the publication *The Technique of the Air Fleet* published descriptions of German units as being the most recent and valuable material. Designing offices were very promptly established at Dessau, Peenemunde, Bleicherode, Berlin and other places, in which, guarded by the Soviet secret police, German specialists completed German projects.

Only now did the Soviet Government begin to realize how much behind they were; a short time before they had treated with great scorn the projects of Leduc (France), Campini (Italy), the famous Englishman Whittle, Lysholm (Sweden), and others; now, when it was too late, they ordered the Soviet scientists to use the obsolete German achievements and hurry, hurry!

The German *Faustpatronen* 88 mm jet-propelled mines, rocket projectiles carried under the wings of aircraft, aircraft jet-units produced by Walter and Heinkel-Hirth, the Argus tube and other developments—these became the basis upon which the Soviet jet-propulsion technique was built. The German rocket and jet-propelled aircraft Me.163 and 262, Ar.234, He.280, 162 and 219, and Ju.287 were also submitted to very careful study. A certain number of these machines, ready to fly, or almost so, were captured intact.

All the Soviet gas turbines are based to date on German units, produced according to German plans, with German equipment, and to a large degree with German raw materials, under the guidance of German specialists and by German workers: M-003 (B.M.W. 003), M-004 (Jumo 004W), M-012 (Jumo 012), and M-18 (B.M.W. 018); there are also the Argus tube (pulse jet), a rocket of the liquid type (Walter), a unit of the V-2 type (for long-distance rockets), and propulsion units of practically all the small rockets, which existed or were being completed in Germany towards the end of the war.

It is important to stress that the M-003 and M-004 units are the *basic* propulsion units of the Soviet Air Force, although they have long ceased to be up to date. In this

Russia's Jet Progress . . . . .

connection a comparison of the M-003 unit with the Nene is instructive:—

	M-003	Nene
Weight/thrust ratio ..	0.66 lb/lb thrust	0.33 lb/lb thrust
Fuel consumption ..	1.20 lb/hr	1.06 lb/hr
Oil consumption ..	6.50 lb/hr	1.5 lb/hr
Thrust rating (max) ..	2,030 lb	5,000 lb

This use of German knowledge allowed the Soviet Union to reach in 1947 the level of development which had been attained by the Germans themselves in the years 1941-3, so it is not an exaggeration to say that the U.S.S.R. was probably ten years behind the world's foremost exponents of jet development. Having awakened from their slumbers, those responsible suddenly realized that they had strayed into a dangerous blind-alley.

But the way out appeared quite unexpectedly: the British authorities sold to the Soviet Government a certain number of British jet units—the excellent Nenes! I know that Minister Khrunichev and Stalin were very grateful for this unexpected favour. We need not doubt that very soon their studies of the Nene will allow Soviet constructors to create excellent combat aircraft, for which they will be awarded many a Stalin prize.

The U.S.S.R. does not possess as yet any jet-propelled bombers, if one excludes a certain number of German Ar.234 and Ju.287; but jet-propelled fighters went into service in 1947.

The first and best of them was the single-seater Mig-9, powered with two M-003 units. This aircraft is of all-metal construction and has a tricycle undercarriage. It was designed by Major-General of the Air Force Artem Mikoyan (chief designer and brother of the Politburo member), Mikhail Gurevich (acting chief designer), and Nilolai Matyuk (chief of the general planning and aerodynamics group at the designs office). The maximum speed of the Mig-9, fully armed, does not in practice exceed 515 m.p.h., but it has a very powerful armament in cannon (1×53 mm+2×20 mm or 13 mm), and that makes it a formidable fighter, although piloting is not as simple as might be desired.

The second fighter is the Yak-15. Its armament is the same as that of the piston-engined Yak-9, and it is powered by two M-004 units, placed in the same way as in the Mig-9. Its maximum speed is 560 m.p.h. The La-15 fighter appears to be less successful; it has not reached its final stage of construction, and therefore it is still too early to speak of it.

The Junkers group at Dessau, headed by the Engineer Baade, deserves special attention. This group produced a completely new gas-turbine-propelled aircraft (something like the Stormovik), which was turned down by a Soviet Governmental Commission in 1946. Baade continued to work towards the perfection of this machine. It is difficult to say what stage his work has reached at present, but, given units of the Nene type, the Baade group is capable of producing good aircraft.

What I have written so far does not disclose any secrets. I do not want to divulge Stalin's real secrets, although I am an enemy of his regime; that signifies that I do not want to describe in detail the precise nature of the work carried out by Baade's group. I will, however, mention that the Soviet Government took special care of the design office of the Siebel firm at Halle, which was working on a project for a 1,680 m.p.h. craft. The design office was transferred complete to the U.S.S.R., where it is continuing its work. Special interest also attaches to the Ju.263 rocket-propelled interceptor, developed from the Me.163 under the direction of Baade. One of these days the Ju.263 may become standard equipment in the Soviet Air Force.

MONOPROPELLANT FOR ROCKETS

A LARGE number of rocket propellants have been examined and tried out during and since the war, and one which has several attractive properties was the subject of a paper "Nitromethane Excels as Rocket Propellant," presented earlier this year at an S.A.E. meeting in New York. The authors were Dr. Fritz Zwicky and Mr. Chandler C. Ross, respectively director of research and chief engineer in the liquid engine department of Aerojet Engineering Corporation.

Summarizing from the *Journal* of the Society it may be stated that ease of handling makes nitromethane a more attractive rocket propellant than common bipropellant combinations. Nitromethane is a monopropellant containing all the constituents in the proper ratio for heat release at high-explosive rates, and it will not decompose under temperature and pressure conditions likely to be met. Tests, it is said, have shown that the liquid is relatively insensitive to shock—although the point has been argued vigorously by rocket specialists.

Containers, pipe lines and fittings for nitromethane present no special problems; corrosion is negligible, and low vapour pressure and low viscosity simplify pumping. All these good handling characteristics of nitromethane contrast with the sensitivity, high vapour pressures, corrosivity, toxicity, and fire hazard of the oxidizers commonly used in bipropellant systems; even so, the performance characteristics are comparable.

Properties of Nitromethane (CH_3NO_2) are as follows: It is a clear, colourless liquid of the nitroparaffin group, having a slight and not disagreeable odour. It decomposes to carbon dioxide, carbon monoxide, water, nitrogen, and hydrogen. Molecular weight of the liquid is 61: specific weight is 70.96 lb/cu ft at 70° F and 68.07 lb/cu ft at 130° F.

DIEPPE RAID ANNIVERSARY

SIX Hornets of the R.A.F., which made two runs over the Square du Canada—the site where the Casino once stood—provided the sole contribution to the Dieppe raid (1942) Commemoration Ceremonies held at Dieppe last Friday. The Canadian Ambassador in Paris, Major General Vanier, and numerous high-ranking Canadian officers, including General Crerar and General Robertson, made this a Canada Day rather than a truly representative anniversary.

Early as was its occurrence, the Dieppe raid—it was much more than the limited word "raid" implies—brought hope of liberation to millions of Frenchmen. The Royal Navy, in more than 200 ships, brought the 6,000-odd troops to their landing points, and the R.A.F. gave close support cover in more than 2,000 sorties from dawn to dusk. The chances of success were negligible: 6,000 troops, however gallant, could not take on the German armies in France. But the raid came as a rude shock to the German complacency and succeeded in pinning down large enemy air and land forces over an extended littoral. It was, also, the first British and Allied attempt to co-ordinate land, sea and air forces on a planned attack.

Present at the ceremonies, which combined Hommage aux Morts with honour to the Canadians and the award of the Croix de Guerre avec Palmes to the town of Dieppe, were contingents of the French Army, Air Force and Navy; but, perhaps significantly, neither French aircraft nor warships were anywhere to be seen. The R.A.F. Hornets on fly-past completely obliterated for several moments the broadcast of an impassioned poem on the subject of liberation, delivered by a Shirley-Temple-type French radio star, 12-year-old Lucie Valnor. One looked in vain for a Union Jack, a White Ensign or a Light Blue Ensign.

ORIGINAL PHOTOGRAPHS

MANY of the most striking photographs reproduced in *Flight* are taken by staff photographers; those of the Vickers-Supermarine 510 (issue of July 28th) and Hawker P.1052 (July 14th) are recent examples.

Readers are reminded that photographic prints of all such pictures (as denoted by the word "*Flight* photograph" used in conjunction with the published illustration) are obtainable; prices for various sizes are as follows:—

Size	Glossy or semi-matt	Toned sepia
6in × 4in	2s	3s 3d
8in × 6in	3s	4s 9d
10in × 8in	4s	6s 3d
12in × 10in	5s	8s
15in × 12in	8s 6d	11s
20in × 16in	11s 6d	15s

There is also an extensive series of postcards (price 8d) illustrating historical and modern British Service aircraft.

Application should be made to Flight Publishing Co., Ltd., Dorset House, Stamford Street, London, S.E.1.

ALTITUDE TESTING: Designed to transport 24 to 31 passengers with baggage and freight, the Armstrong Whitworth Apollo is capable of carrying a total payload of 7,500lb for 1,000 miles at 276 m.p.h. at 20,000ft. A maximum cruising speed of 305 m.p.h. is attainable.

U.K. Routes Agreement with Canada : D.H. Servicing Base : Dakota with Pressurized Cabin

B.E.A. DAKOTA CRASH

At approximately 1300 hr last Friday (August 19th), a B.E.A. Dakota crashed at Greenfields, a few miles from Oldham, Lancs. The aircraft had left Belfast on the 1150 hr service and was due at Manchester at 1310. The weather was not good at the time and, after passing over Ringway Airport, the Dakota hit the ground about 20ft from the summit of a hill approximately 1,300ft in height. There were 29 passengers (including three infants under two years of age) on board, 21 of whom were killed. Capt. F. W. Pinkerton and two other members of the crew of four also lost their lives.

It would be premature to comment upon the specific circumstances of this most recent disaster, but it does appear, from first reports, to have been to some extent comparable with the Atlantic ditching of a Transocean Air Lines Skymaster four days earlier. In the case of the Skymaster, although communication appeared to have been lost through some unforeseen circumstances, the aircraft ran out of fuel when other bases might possibly have been used. Whether the B.E.A. Dakota had developed some mechanical or other fault is not known, but if no such trouble had occurred, it is certain that it should not have been below safety height in the vicinity of high ground clearly marked on all maps.

U.K.-CANADA AGREEMENT

BY the terms of a new air services agreement signed between the United Kingdom and Canada on August 19th, this country obtains five routes. The selected British airline is permitted to fly through Gander to New York, Bermuda and beyond; to Montreal via Gander; from the British Colonies in the Caribbean area and Bermuda to Montreal; across the Pacific between Fiji and Vancouver; and to Hong Kong via North Canada, Alaska, the Aleutians, Japan and Shanghai. The agreement gives Canada four routes: between Canada and the U.K.; from Canada via Bermuda or Tampa (Florida) to the British Colonies in the Caribbean area and beyond to South America; from Vancouver through Fiji to Australia and New Zealand; and between Vancouver and Hong Kong.

The arrangement made in 1947 is continued whereby the Canadian airline flying between Canada and the British Colonies in the Caribbean area enjoys cabotage rights between Bermuda and the other British Colonies. The U.K. undertakes not to operate on its reciprocal route between Bermuda or the British Colonies in the Caribbean area and Montreal until January 1st, 1951. As far as Bermuda and the Bahamas are concerned, the agreement is subject to approval by their legislatures.

STRATOCRUISER TRAINING

B.O.A.C. Stratocruisers will be manned by crews consisting of two pilots, two engineers, a radio officer and a navigator. Specialists in each branch have already been trained at the Boeing school, Seattle, Washington, and they will instruct the remaining B.O.A.C. aircrew in a Stratocruiser school recently opened at the Corporation's base at Filton, Bristol. Thirty-five complete aircrews and 170 ground staff will be required for the Corporation's Stratocruiser North Atlantic operations, for which a special flight has been formed under Capt. J. W. Burgess. The officer in charge of training is Capt. J. T. Percy, assisted by Capt. W. S. May as chief flying instructor. Each has some 10,000 flying hours to his credit and many years' experience of North Atlantic flying. Four technicians from the Boeing factory have arrived to assist in the initial stages of training, and for instrument-flying training a D.H. Dove has been equipped with an instrument panel similar to that of a Stratocruiser.

D.H. REPAIR AT LEAVESDEN

CLOSING of the D.H. Civil Aircraft Repair Depot at Witney, Oxfordshire, as part of the post-war re-development of the de Havilland Aircraft Company's resources, was reported in *Flight* of July 7th. New information is now avail-

Civil Aviation News . . . . .

able concerning the future organization of this section of the business. Now based at Leavesden—and, as before, under the direction of Mr. A. J. Brant, service manager—the section will be known as S.D.C.R. (Service Department, Civil Repair). Mr. K. C. Brown, who was in charge at Witney, will continue to be responsible for all the work, which includes C. of A. overhauls for de Havilland operators, the repair of non-current Service types such as the Dominie, and that civil work which in the past was undertaken at Leavesden as well as at the Witney establishment; the last-named duties include flight-testing of aircraft handled under repair contracts, major maintenance of the company's fleet of communication aircraft and other work such as that arising from other contracts and the "fly-in" service available in connection with the Gypsy Engine Replacement Scheme.

The full address of the reorganized department is: The de Havilland Aircraft Co., Ltd., Service Department (Civil Repair), Leavesden Aerodrome, Herts. Telephone: Garston (Watford) 2261. The new arrangements do not affect the organization of the de Havilland Engine Company's Service Department, which has had its headquarters at Leavesden since the war.

RAPIDE ACCIDENT REPORT

THE Chief Inspector of Accidents has submitted his report* on the accident to D.H. 89A Rapide G-AKOF which force-landed in the River Mersey on November 11 last year, causing the deaths of the two crew members and five passengers. The aircraft belonged to Mannin Airways, Ltd., and took off from Collinstown Airport, Dublin, at 1602 hr on a return charter flight to its base at Ronaldsway, carrying six passengers and piloted by Capt. J. C. Higgins, M.B.E., managing director of the airline. The pilot, who was 48 years of age, had some 14,500 hours' flying experience.

Weather conditions at Ronaldsway prevented the aircraft from landing and, after orbiting south of the airport for about an hour, Capt. Higgins decided to divert to Speke Airport, Liverpool, where the weather was satisfactory. About three miles from Speke fuel became exhausted and the pilot was forced to ditch in the buoyed channel one mile north-west of Garston Docks. The passengers and crew climbed from the cabin and clung on to the aircraft, which sank after approximately 25 minutes. Only one passenger succeeded in reaching the shore. The last signal from the aircraft had been "I am going to land on the shore—no fuel"; this was received at 1816 hr, but there was doubt as to which shore was meant, and a "snap" bearing taken by Speke passed over more than one shore. New Brighton lifeboat was launched at 1835 hr, but further delay followed as a result of conflicting messages as to the location of the ditching.

Inspection of the salvaged aircraft revealed nine unused life-saving waistcoats, one under each seat. In the opinion of the Chief Inspector of Accidents, the accident was caused by the exhaustion of fuel brought about by the miscalculation of the pilot. The air-traffic control services had been satisfactory and every assistance had been given to the aircraft.

* *M.C.A. Publication 72; His Majesty's Stationery Office; price 1s.*

British Airways' Operating Statistics for April, 1949

(Figures for the corresponding period in 1948 are given in parentheses)

	B.E.A. All Divisions	B.E.A. Continental Division	B.E.A. British Division	B.O.A.C. All Divisions	B.O.A.C. Western Division	B.O.A.C. Eastern Division	B.S.A.A.
Passengers carried:	52,831 (39,520)	22,924 (13,755)	29,907 (25,765)	11,343 (10,348)	2,990 (3,132)	8,353 (7,216)	2,155 (1,407)
Cargo carried:							
Mail (tons)	273.3 (139.7)	181.9 (49.2)	91.4 (90.5)	128.4 (144.8)	27.8 (25.8)	100.6 (119.0)	15.3 (15.5)
Freight (tons)	424.9 (294.3)	303.0 (199.8)	121.9 (94.5)	267.9 (250.7)	52.4 (53.2)	215.5 (197.5)	41.5 (53.7)
Overall revenue load-factor (per cent)	57.3 (60.3)	56.9 (69.0)	58.3 (46.8)	61.0 (63.0)	62.2 (54.8)	60.8 (65.3)	37.7 (61.6)
Average load:							
Passengers (No.)	13.5 (12.1)	13.9 (15.4)	12.9 (8.7)	17.6 (14.2)	28.6 (21.7)	16.2 (13.1)	8.6 (10.0)
Total (lb)	2,973 (2,638)	3,220 (3,522)	2,473 (1,677)	5,134 (4,194)	6,039 (6,511)	4,582 (3,872)	3,198 (4,108)
Average capacity:							
Seats (No.)	22.6 (19.7)	23.7 (22.5)	20.7 (16.8)	25.0 (20.5)	39.0 (40.8)	23.2 (17.4)	20.2 (17.8)
Total (lb)	5,188 (4,377)	5,655 (5,107)	4,240 (3,584)	8,416 (6,657)	9,714 (11,885)	8,197 (5,931)	8,493 (6,674)
Average length of haul (miles):							
Passenger	289 (274)	434 (496)	173 (154)	2,883 (2,943)	2,007 (2,050)	3,189 (3,310)	1,212 (3,171)
Mail	443 (333)	581 (712)	169 (127)	4,735 (4,318)	3,672 (3,412)	5,029 (4,515)	5,116 (5,520)
Freight	461 (503)	571 (663)	187 (165)	3,821 (3,192)	2,974 (3,077)	4,026 (3,223)	4,537 (5,208)
Hours flown:							
Revenue: Passenger services ...	7,606 (6,398)	4,302 (2,703)	3,304 (3,695)	9,149 (11,139)	855 (1,169)	8,294 (9,970)	1,473 (2,072)
Cargo services ...	465 (259)	465 (259)	— —	1,091 (943)	462 —	629 (943)	331 (40)
Charter and special flights	147 (54)	42 —	105 (54)	273 (312)	— —	273 (312)	626 (37)
Non-revenue	634 (250)	99 (108)	165 (95)	821 (1,773)	110 (641)	711 (1,132)	226 (213)
Equivalent annual utilization (revenue hours flown) per aircraft	1,231 (1,118)	1,420 (1,065)	1,037 (1,196)	1,326 (1,264)	— —	— —	1,739 (1,497)
Unduplicated route miles in operation at end of period	13,374 (11,680)	10,432 (9,173)	2,942 (2,507)	61,902 (58,634)	7,700 (8,523)	54,202 (50,111)	12,929 (18,378)
Percentage regularity	96.4 (98.6)	96.1 (99.0)	96·6 (98.5)	97.4 (99.3)	98.2 (98.7)	97.2 (99.4)	97.7 (99.5)
Average length of stage flights (miles) ...	202 (172)	363 (389)	111 (111)	1,045 (940)	1,078 (1,177)	1,040 (915)	846 (1,103)

PASSENGER-MILES flown by the three Corporations during April, 1949, exceeded 48,000,000, an increase of 15 per cent over the previous month, and of 12 per cent over April, 1948 Together, more than 3,500,000 aircraft miles were flown (a figure comparable with that of the same month last year), but the total capacity made available was 20 per cent greater. There has been a noticeable increase in the amount of freight carried on the internal services and the number of passengers and mail on international services The average length of stage in the B.E.A British Division is unaltered, but on the Continental Division it decreased from 389 to 363 miles. In B.O.A.C., the average length of stage on the Eastern Division was 1,040 miles compared with 915 miles in April, 1948, and in the Western Division it was 1,078 miles compared with 1,177 miles in 1948. B.S.A.A. average length of stage has decreased to 846 from 1,103 miles. Non-revenue flying in each case includes training, and the discrepancy between the aggregate figure for non-revenue flying in the B.E.A. Continental and British Divisions and the figure for B.E.A. All Divisions, lies in the fact that training by Divisions cannot be assessed.

PRESSURIZED DAKOTA

A DAKOTA has been converted to "V.I.P." interior standards, and equipped with a pressure-cabin unit, by Scottish Aviation, Ltd. The work has been carried out for Bharat Airways, and the aircraft is to be used for carrying a very senior Indian Government official who, for health reasons, is unable to fly above the pressure altitude of 1,000 ft. The specification called for a pressure cabin incorporating a toilet compartment, accommodation for a secretary or attendant, and furnished with a divan bed and two adjustable seats. The rest of the passenger capacity was required to accommodate additional staff and has been equipped with four fully adjustable rotating seats mounted on rails, a small lounge and a baggage compartment. Tables have been fitted among the seating in both cabins, and there are telephones for intercommunication throughout the aircraft.

The most interesting feature is, of course, the pressure sub-cabin, which is elliptical in section and incorporates an air-lock or trap to permit entrance to and exit from the unit when it is under pressure. The seals on the two doors of the air-lock are automatically inflated or deflated when the handles are turned and the design of the latches is such that neither door can be opened until the pressure on each side has been equalized. The entrance to the pressure unit is at the after end and passage between front and rear of the main fuselage is possible along the port side, exterior to the sub-cabin. Four windows have been built into the unit and the aircraft fuselage windows have been modified to give a reasonable field of vision from the cabin. The pressure equipment, supplied by Normalair, Ltd., has been duplicated throughout to the requirements of the A.R.B.

An atmosphere pressure condition equivalent of up to 1,000 feet above sea level is provided at any aircraft altitude up to 8,000 ft. The maximum positive pressure differential is 3.8 lb/sq in with an ultimate factor on the structure of 1½, giving an ultimate positive differential pressure of 5.7 lb/sq in. The maximum negative pressure differential is 2 lb/sq in with an ultimate of 3 lb/sq in. A rate of ascent up to 2,400 ft/min is permitted and the maximum permissible rate of descent is 2,000 ft/min.

As this aircraft will be operating in India at relatively low altitudes, particular attention has been paid to cooling in the pressure cabin, and in view of the heavy rains met during the monsoons special air intakes have been designed to prevent the blower system from delivering water instead of air into the pressure-cabin.

INTERNATIONAL TRAVEL MEETING

THE Fourth International Conference and Fifteenth General Assembly of the International Uñion of Official Travel Organizations is to be held in Luxembourg from September 20th to 24th. Attending the Conference will be some 70 delegates and observers—representing national travel organizations and Government departments—from Europe, Asia, Africa, North America, Latin America and Australasia. Also present will be representatives of the following interested international organizations: United Nations Economic Commission for Europe, U.N.E.S.C.O., O.E.E.C., International Hotel Association, I.A.T.A., and the International Road Federation.

BREVITIES

WITH the recent commencement of their Pacific service, Canadian Pacific Airlines are in process of transferring their headquarters to the West; the administrative staff has already moved from Montreal to Vancouver.

* * *

According to *South African Railway News*, Palmietfontein Airport handles on an average more than 10,000 passengers every month. Nearly 40 airliners land or take-off daily on overseas and domestic services.

* * *

Following the cease-fire order in Java at midnight on August 10th, K.L.M. resumed services between Batavia and Djogkarta, the Republican capital. Indonesian air hostesses are employed on this and other Far Eastern routes.

* * *

The Institute of Transport announces the award of the Bristol and White-Smith Air Transport Medal to Mr. J. W. S. Brancker, general manager of Eastern Division, B.O.A.C., for his papers on "Some Aspects of Passenger Comfort in Aircraft" and "The Effect of Nationalization on Air Transport." The Bristol and White-Smith Student Prize has been awarded to Miss P. M. Powlesland, of B.O.A.C., for her paper "Carriage by Air."

* * *

Reduced B.E.A. fares to Copenhagen, Oslo and Stockholm will come into operation on November 1st and continue until March 31st. These "winter excursion" return fares, valid for 23 days, will be as follows: Copenhagen, £32 (£7 3s. reduction); Oslo, £35 (£7 15s.); Stockholm, £37 (£11 17s.).

* * *

Air-India International is understood to be watching with particular interest the development of the Comet, in view of its possibilities as an eventual replacement for its Constellation fleet. Tata Airlines, predecessors of Air-India had considerable experience in operating de Havilland aircraft: Puss Moths were used on the Karachi-Bombay mail run in 1932 and subsequently Leopard Moths, Fox Moths, Rapides and D.H. 86s were flown on Indian domestic services.

* * *

Rolls-Royce have confirmed that two Dart turboprops are being installed in a Dakota. Although it must be some time before the aircraft will fly, it is probable that it will be used as a test-bed for operational trials.

* * *

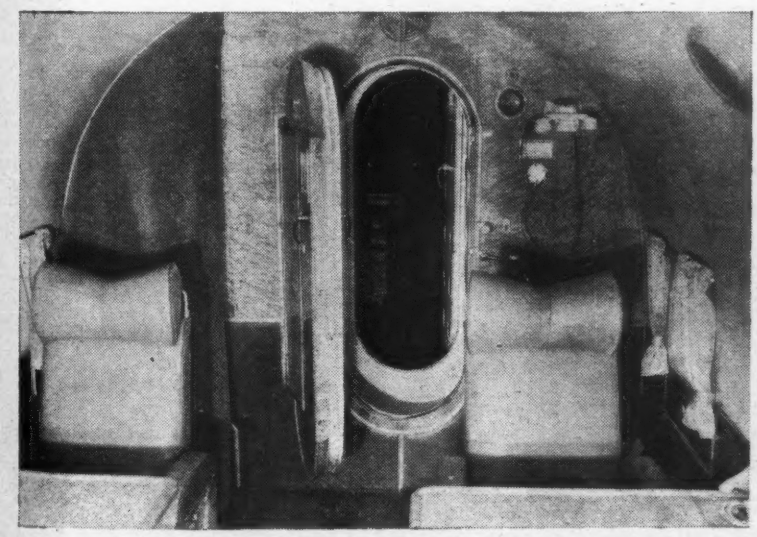
Instructions have been issued to all K.L.M. pilots that electric autopilots are not to be used until further notice. The ban does not imply that the crash of a K.L.M. Constellation near Bari on June 24th was directly caused by a fault in the automatic pilot, but it is purely a safety measure. It is believed that all the company's Constellations are fitted with the Bendix electric autopilot.

* * *

Some 3,500 booking enquires are re-received daily by B.E.A. telephone at Dorland Hall, London. To provide for further increases they have installed a switchboard capable of handling 20,000 calls a day—the biggest of any airline in Europe.

* * *

In the seven months since Convairs were introduced on T.A.A. services the first four have flown more than a million miles and the load-factor has exceeded 80 per cent. The company claims that utilization averages 8½hr per day, at which rate the type is more economical to fly than either the DC-4 or the DC-3 on the same routes The T.A.A. fleet now num-



PRESSURE LOCK: The entrance to the pressure sub-cabin installed in a Bharat Airways Dakota by Scottish Aviation, Ltd., as described on this page. Passage to the flight-deck is along the port side of the fuselage.

Civil Aviation News . . . . .

bers 35 aircraft and route-mileage has increased from 3,134 in 1946 to 7,780 in 1947 and to 13,652 at the end of 1948.

* * *

It is reported that Turkey and Greece have refused transit permission to a Yugoslav air-transport concern planning to establish a regular service between Yugoslavia and Israel.

* * *

American Airlines report a profit of £884,000 for the six months ended June 30th. Total revenue amounted to £12,438,000, which was 29 per cent higher than the figure for the first six months of 1948. Revenue passenger-miles increased by 28 per cent to 760,114,000; increases in mail ton-miles were 34 per cent and in freight ton-miles 51 per cent.

* * *

Air India has increased the frequency of services on the Bombay-Calcutta route from nine to eleven a week in each direction; nine are flown non-stop with Vikings and the other two by Douglas DC-3s which make a refuelling halt at Nagpur. DC-3s are also flying on the Bombay-Madras service, which has been increased from a five-a-week to a daily frequency.

* * *

During the year ended March 31st, New Zealand internal air services flew 4,015,831 miles, carrying 174,836 passengers, 1,923,626 lb of freight and 752,492 lb of mail. The annual report by the Civil Aviation Department states that £275,000 was spen. on maintaining 82 airfields.

* * *

With the introduction by Swissair of a Zurich-Belgrade service, passengers from London are now able to reach Belgrade in one day. The B.E.A. and Swissair flights leaving Northolt Airport in the morning reach Zurich in time to connect with the Zurich-Belgrade service which leaves at 1350 hr. and arrives at Zemun Airport, Belgrade, at 1740 hr. The through fare, London-Belgrade, is £36 16s. single or £66 1s return.

FROM THE CLUBS

THE Association of British Aero Clubs and Centres has been fortunate enough to make arrangements with the Ministry of Supply whereby all landing fees will be waived in respect of club and privately owned aircraft landing at White Waltham to attend the Association's Summer Convention on September 3rd. (Some details of the Convention appeared on p. 154 of *Flight* for August 11th.)

In connection with the tour of flying clubs arranged for next week-end, when the A.B.A.C.C. chairman will be accompanied by Mr. Geoffrey de Freitas and officials of the Air Ministry, and Mr. Lindgren, of the M.C.A., an itinerary has been agreed. Starting from Elstree at 9.30 a.m. on Saturday, the party will fly to Panshanger, Sywell and on to Elmdon for lunch. In the afternoon they will visit Ratcliffe, Sherburn (for tea), Yeadon and Squires Gate, staying the night in Blackpool. On Sunday morning the Dakota will take off for Hooton Park and from there the party will fly south to Wolverhampton and on to Bristol to be entertained for lunch. Visits will be made in the afternoon to Weston-super-Mare, Thruxton and Redhill; thence a return will be made to Elstree.

* * *

BROOKSIDE Flying Group of the Ultra Light Aircraft Association (based at Shoreham) has acquired a Magister, which may be flown by members at 35s per hour. One of the Group's chief difficulties, however, is the scarcity of flying instructors to keep the aircraft fully employed, and the Group would be pleased to hear from any who would be interested to help.

The Community Flying Club at Woodley, Reading, is still in difficulties as a result of a notice to leave, since other accommodation is difficult to find. At Elstree, by arrangement with one of the private-owner members, the Experimental Group is operating an Auster for instructional purposes; support is being given to the South Hants Group for its display at Christchurch on September 3rd with the Auster and the Group's Bibi. R.A.F. support has been promised for this display, and the Association hopes to have there the Zaunkoenig and possibly several other machines.

It is understood that flying facilities can be offered at Gatwick should a U.L.A.A. group be formed there. The Association is keen to assist in every way to form such a group, for there are believed to be a number of members in South London who would find Gatwick a convenient centre.

* * *

PRIVATE flying in South Africa is likely to be seriously affected by the Government control of imports. Such drastic restrictions have been imposed upon the import of light aircraft and spare parts, most of which are normally bought from the United States, that only a fraction of the 1946-47 purchases will be permitted. Attempts have been made to convince the Government that the restriction on spares, after light aircraft have been allowed into the country during the post-war years, will result in the closing-down of aircraft maintenance and repair organizations, flying clubs and the whole of private flying. Already some aircraft have been grounded, including several owned by the Government, and it has been estimated that non-commercial flying throughout the country will cease within three months.

HISTORY REPEATED: Assembled at Hooton Park in 1932, this Comper Swift now belongs to Mr. R. F. Clear, an Airspeed test pilot. It was owned for a period in pre-war years by Mr. G. B. S. Errington, the same company's chief test pilot. It is here seen at Christchurch Airfield beside one of the two prototype Ambassadors.

INDESTRUCTIBLE?

THE Comper Swift illustrated on this page has had an interesting and chequered career. It was first bought by an Indian private owner in 1932 and during a subsequent flight back to this country was force-landed in the desert after leaving Cairo. The wreckage was shipped to Heston (whence Comper Aircraft had moved from Hooton Park) and was finally purchased by Mr. G. B. S. Errington in 1934. The Comper Swift was then rebuilt and used as a personal transport, among its various trips being a flight to Stockholm, where such a diminutive machine created something of a stir. During the war it was stowed away, but in spite of its long hibernation it was in such a condition that, over a period of three months, Mr. R. F. Clear, the present owner, brought it up to C. of A. standard in his spare time. Except for a 10-gall long-range tank from which fuel is hand-pumped into the normal 15½-gall gravity tank, the aircraft is a fairly standard Comper Swift powered by the usual Pobjoy geared radial of 75 b.h.p. The only notable exterior difference between this Swift and its contemporaries lies in the fact that the cockpit entry has been made large enough for entry and exit with a seat-type parachute.

It will be remembered that A. L. Cole, flying his Comper Swift, *Black Magic* gained third place in the King's Cup race at Elmdon at a speed of 126 m.p.h. It now has a diminutive windshield.

NO GALLEY SLAVES

The Interior Layout of B.O.A.C. Stratocruisers : Another Viewpoint

IT is now customary for an aircraft manufacturer to consult with the operator on every detail of a new design before work is even started and to continue to hold consultations at each stage of construction. In particular, the planning of the interiors of airliners has become almost entirely the responsibility of the individual customer, each one contracting for a layout which he considers most suitable for the work to be undertaken. This absence of a basic interior design applies to the Stratocruiser.

Some views, originating in America,* on the costs of the interior layout of B.O.A.C. Stratocruisers, were recently published and tend to convey a wrong impression. In particular, the position of the galley was adversely discussed, since the B.O.A.C. central location was thought to be a modification to a basic layout which incorporated the galley at the rear. Those views, in some instances, were keenly critical and therefore merited further examination on this side. As is usually the case, when all aspects of a story have been heard it assumes a different complexion. Particularly if the picture is surveyed from the beginning.

Much of the criticism advanced can be traced back to the delayed delivery of the Stratocruisers, which is, of course, most unfortunate and embarrassing, but no one could have foreseen the prolonged strike which has brought this delay about. Apart from the strike, there has, it appears, been further delay as a result of certain development problems quite outside the prospective operators' control, and B.O.A.C. are not the only airline to be so inconvenienced. It should not be overlooked that the original discussions between the manufacturers and B.O.A.C. started nearly four years ago—in fact, before the end of the Japanese war, when the aircraft was merely in the design stage as a civil development of the C-97 military transport based on the B-29 Superfortress. At that time purchasers were quoted a basic price for the aircraft virtually as a "shell" (as, indeed, is common practice), leaving each customer to submit his own plans for interior layout and equipment. The galley was specifically to be customer-furnished equipment in every case. Guided by long-range forecasts on traffic trends, and their own convictions and experience in passenger comfort and service in the air, the B.O.A.C. interior layout committee presented a design incorporating an amidships galley. A central position for the galley was chosen by B.O.A.C. in accordance with their normal policy as seen in the Solent, Canadair, and Bristol 175. Experience only can prove the merit of the decision applied to the Stratocruiser.

*"*American Notebook,*" "*Flight,*" August 4th.*

The cost quoted by Boeing was matched, including spares and ancillary equipment, to come within a Treasury approval of 12 million dollars, and B.O.A.C. confirms that the cost of the project is still inside the sum so provided. The actual prices paid by individual purchasers for each order, incidentally, remain a confidential matter between purchaser and manufacturer.

Although Pan American had ordered 20 Stratocruisers with a rear galley (and being the first purchaser, they obviously obtain first delivery) their design cannot be considered in any way a basic one; in fact, no particular interior layout was adopted by the manufacturers as a basic design. Apart from B.O.A.C., United Air Lines, the American domestic operators, are another company who have ordered centrally located galleys in the Stratocruiser. In order to save conversion costs the four Stratocruisers ordered by Scandinavian Airlines System and subsequently repurchased from them for sterling by B.O.A.C. will be accepted with rear galleys.

Maintenance-base Transfer

Three years ago, when the B.O.A.C. Atlantic Division (as it was then called) maintenance was done in Montreal, the aircraft order was placed and delivery was expected to begin after 18 months. There was no suggestion at that time of the base being transferred to England. To save American dollars on both capital and labour the galley with its British equipment was designed by B.O.A.C. and manufactured at Montreal in readiness for the Stratocruisers which were to be delivered there from Seattle. Installation would then have been a Canadian dollar item with B.O.A.C.'s own staff at its own base. The ovens themselves are British equipment purchased for sterling. By reason of the aforementioned delay in delivery and the removal to Filton of the B.O.A.C. base, the benefit of this scheme has been lost.

An immediate advantage of the central galley is that room is provided for an extra toilet in a strategic position, an important consideration in view of its 65 passenger accommodation, and at the same time no seating accommodation is sacrificed. It will not escape observation that a central galley provides maximum stability in rough air for the stewards during their culinary activities. Looking further ahead, and studying the plans, it would appear that B.O.A.C. have provided themselves with a flexible layout and can, if need be, offer self-contained two-class travel without major modifications should such a system be introduced within the life of the Stratocruiser.

WORLD FLIGHT COMPLETED

MRS. RICHARDA MORROW-TAIT landed at Prestwick last Friday afternoon from a round-the-world flight which had taken a year and a day. Starting in a Percival Proctor (Gipsy Six) on August 18th, 1948, with Mr. Michael Townsend as navigator, she flew by way of Marseilles, Cyprus, Bahrein, Karachi (September 3rd), Delhi, Calcutta, Rangoon, Hong Kong, Shanghai, and Tokio (October 27th); they then began the hazardous North Pacific Ocean section of the flight, from Japan to Alaska *via* the Aleutian chain, and reached Shemya, Alaska, safely on November 4th, only to have the Proctor wrecked in an almost-successful forced-landing on a highway as a result of fuel shortage. (The special navigational and meteorological problems of this section of the flight were described by Mr. Townsend in an article in this journal on June 30th last.)

As there was no possibility of resuming the flight immediately, the navigator returned to this country to complete his studies for a forthcoming examination at Cambridge and the pilot stayed in the United States in an effort to raise money for another aircraft in which the journey could be completed.

Eventually, an elderly Harvard was purchased and, after various adventures—which appear to have included brushes with the U.S. and Canadian governments over such matters as an export licence—she reached Greenland on August 13th, where Mr. Townsend rejoined her. On August 17th-18th they flew to Reykjavik, Iceland, and on to Prestwick the next day.

MECHANICAL-HANDLING EQUIPMENT

THERE can be few firms in the aircraft and allied industries which do not, to a greater or lesser extent, make use of mechanical-handling facilities in their works. Those who are considering the acquisition, during the coming year, of new plant of this kind may be interested to learn that the Mechanical Handling Exhibition, first held in London with considerable success in July, 1948, is to be repeated at Olympia, London, from June 6th to 17th, 1950. The Exhibition will be larger than the first one, and its run of 11 days instead of nine has been arranged to include two Saturdays.

Exhibits will cover the full range of equipment for the handling, lifting, stacking and short-distance transportation of goods; they will include trucks, conveyor and elevator systems, ropeways, cranes, hoists, winches, and all accessories.

The Exhibition is organized by *Mechanical Handling*, one of the publications of Associated Iliffe Press, and is supported by the leading industrial associations concerned.

NATIONAL GLIDING CONTESTS

The Meeting Begins : 74-mile Goal Flight by Philip Wills

AS related last week, when we discussed prospects for the event, the National Gliding Contests are being held all this week at Camphill, Great Hucklow, the site of the Derbyshire and Lancashire Gliding Club. Thirty sailplanes—awards go to the individual aircraft rather than to their pilots or the teams which have entered them—appear in the list of nominations, but a few are non-starters.

Last Saturday, the first day of the meeting, was set aside for the examination of the necessary documents testifying to the airworthiness of competitors' machines, their competence to fly them and the accuracy of their flight-recording barographs. The day was also available for flying practice.

By the middle of the morning most of the competing teams had arrived. Many of them are camping, and in a field across the road from the club buildings a motley collection of assorted tents was seen to grow—yet another proof of the individuality of the soaring people.

The task of taking the aircraft out of their trailers and assembling them began early: it was going to be a daily routine, for there is, of course, no room for all these sailplanes in the club hangar. The job is one that can easily be performed by an experienced team within a quarter of an hour.

The north end of the hangar had been curtained off to form an operations room. At 10 a.m. we assembled there for the practice-flying briefing. The meteorological expert told us that we were near the centre of an anti-cyclone and that the thin layer of cloud overhead would presently break and the sun cause thermal currents to rise to about 3,000ft above the airfield; unfortunately, however, only light winds could be expected and it was doubtful whether it would be possible to use any of the soaring slopes. A daily prize for height was offered and it would be a matter of "catching a thermal" after a winch launch. The longest possible cable was used, first from south to north, and then in the opposite direction, to fit in with the light, fitful breeze.

No. 3, a red Olympia piloted by Professor J. Buckley of the School of Tropical Medicine, took the first launch. He stung the other competitors into increased activity by circling in lift right away. His climb ended, however, at a little above 1,000ft and most of the 60 launches given during the rest of the day led to circuits without finding lift.

G. O. Smith, C.F.I. of Derby and Lancs Club, as chief marshal for week, checks the release mechanism of the Surrey Club's Weihe.

Making ready on Saturday : gliders emerging from their trailers

The prize went to No. 26, an EoN Olympia entered by the Cambridge University Gliding Club and flown by T. G. Phillips. He took on and thoroughly exploited a thermal discovered by a joy-riding two-seater. Reaching the base of a cloud at 2,900 feet he climbed another 1,000 feet within it—which seemed to be about all it had to give. Phillips is a post-war *ab initio* pupil of the Cambridge Club. His skilful blind soaring in cloud, a technique which was once a stringent efficiency-bar beyond which only a few aces ventured, shows the great progress which is being made in sailplane instrument-flying, and which is largely due to the use of stable, viceless machines and the spreading of an understanding of the problem involved.

F/L. Mallet (of one of the B.A.F.O. teams) testing his R/T.

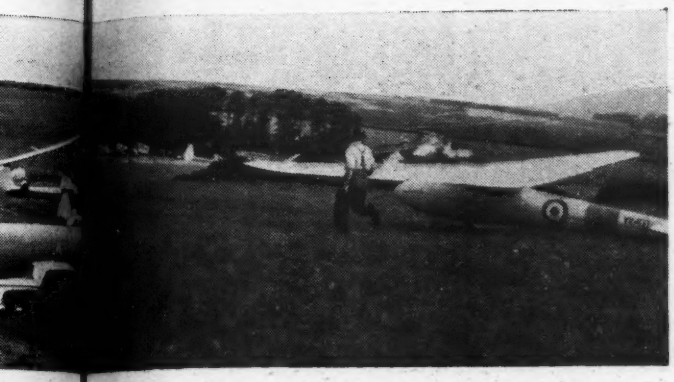
By the end of the day all the competitors had reported except teams No. 8, 21, 25 and 28, who will not be flying. No. 31 was allotted to Señor Ortner, the President of the Albatross Soaring Club of the Argentine, who is flying an Olympia which he will be taking home. Though flying in the Contests, he will not be available for an award, since the meeting is con-

LEADING DATA ON THE PRINCIPAL COMPETING GLIDERS

Glider	Span (ft in)	Wing Loading (lb/sq ft)	Aspect Ratio	Wt. Empty (lb)	Load (lb)	Min. Sinking Speed (ft/sec)
Weihe ...	59 1	3.76	17.8	418	319*	1.8
Olympia...	49 2	4.15	15	430	240	2.2 at 39 m.p.h.
Gull I ...	50 3	3.5	15.8	379	225	2.31
Gull IV ...	49 3	4.2	15.5	475	225	2.3 at 38 m.p.h.
Kranich ...	59 1	4.2	14.3	560	460	2.3

NOTE : All the above are high-performance single-seaters with the exception of the Kranich, which is a two-seater.

* The high maximum load of the Weihe allows for the carrying of jettisonable water ballast or of extra equipment such as oxygen and electric batteries.



Launching the EoN Olympia of the Empire Test Pilots' School.

fined to British Nationals. Thus the stage was set for a week of very interesting soaring if the weather did not refuse to play its part. The present anti-cylone weather, coupled with some wind, might well result in the new "standing-wave" soaring technique being used in competitive soaring for the first time.

On Sunday, for the beginning of competitive flying, the meteorologists had nothing more exciting to offer than some more warm and rather quiet anti-cyclonic weather. The centre of the anti-cyclone had shifted to the North Sea but it was feared that the light, variable southerly winds which it was causing would not be sufficiently strong for soaring the south slope. Scattered thermals were expected to rise to about 3,000ft locally and possibly higher later on, with increasing southerly winds. Again, therefore, it would be a matter of trying to connect with the rising air during the short respite offered by a winch launch.

D. Reid (Weihe) tied with G/C. Murray for second-best cross-country flight on Sunday, covering 59 miles, to land at Dishforth.

Three winches were put into operation and the competitors began to queue up opposite them at the other end of the field. A few pilots seemed to locate the sky-hooks and before lunch three had managed to hang on long enough to drift slowly away at a useful height—G/C. Murray and F/L. Mallett, in two of the B.A.F.O. Weihes, and the guest from the Argentine. They were followed by Robertson (Olympia EoN) an hour later.

It was feared earlier in the day that a sheet of medium cloud might interfere with solar heating of the ground, but fortunately it dispersed completely; even if the weather which resulted was not absolutely ideal for soaring-away it was certainly first-class for the crowd of 6,000-odd spectators.

At lunch-time the Under-Secretary of State for Air, Mr. Geoffrey de Freitas, who had landed at Woodford in an Anson, came over to watch the proceedings.

One of the team from the Empire Test Pilots' School had the misfortune to drop the team's Olympia, while landing, from a sufficient height to break its back.

Soon after lunch another batch of five pilots went away, slowly gyrating upwards through the sunny haze towards the cumuli well scattered in the sky. In such weather, and with winch launching, a great element of luck adds itself to or

NUMBERS, COMPETITORS AND GLIDERS

1. D.G.O. Hiscox (Olympia EoN).
2. Bristol Gliding Club—K. W. Turner, C. Staffurth (Olympia EoN).
3. J. Hurry, N. P. Anson, J. Buckley (Olympia EoN).
4. P. J. Cooper, A. A. J. Sanders, A. H. Yates (Olympia EoN).
5. J. S. Armstrong, L. R. Robertson, E. H. Taylor, L. R. Bulling (Olympia EoN).
6. T. Rex Young, A. N. Other (Olympia EoN).
7. G. H. Lee, C. J. Arnold (Slingsby Gull I).
8. Prince Birabongse (Weihe).
9. P. A. Wills (Weihe).
10. E. Swale, T. Dolan, Margaret Swale (Olympia EoN).
11. Empire Test Pilots' School—Lt.-Cdr. P. S. Wilson, R.N. (Olympia EoN).
12. C. J. Wingfield, D. Ince (Olympia EoN).
14. D. A. Smith (Olympia EoN).
15. A. H. Warminger, J. C. Ward, P. O. Gould (Olympia EoN).
16. Surrey Gliding Club—J. C. Neilan, W. A. H. Kahn, D. Reid, D. Brown (Weihe).
17. Imperial College Gliding Club—R. A. B. Macfie, P. Murden, R. Nurney, F. G. Irving (Olympia EoN).
18. Surrey Gliding Club—J. A. Sowrey, G. R. E. C. Gregory, C. W. Dowdall, W. F. Jordan (Olympia EoN).
19. London Gliding Club—P. A. Lang, J. R. Court, H. G. Wheatcroft (Kirby Prefect 308).
20. London Gliding Club—C. A. P. Ellis, L. Wright, A. E. Rowley (Kirby Gull IV).
21. 12 Group Gliding Club—W/C. A. J. M. Smyth, F/O. F. Hutchinson, Plt. Il. Campel, F/O. T. R. D. La Touche (King Kite).
22. B.A.F.O. Gliding Club—F/L. P. G. Mallett, F/L. C. T. Lynas (Weihe).
23. B.A.F.O. Gliding Club—F/L. R. C. Forbes, S/L. A. A. Binks (Weihe).
24. Association of B.A.F.O. Gliding Clubs—G/C. W. B. Murray, Sgt. D. Campion (Weihe).
25. G/C. G. J. C. Paul, J. W. Leach (Kirby Kite II).
26. Cambridge University Gliding Club—P. H. Blanchard, J. Free, T. G. Phillips, F. R. Ward (Olympia EoN).
27. Cambridge University Gliding Club—J. W. S. Pringle, J. Grantham, D. L. Martlew, A. L. L. Alexander (Kranich).
28. Dr. A. Derkedder, S. C. O'Grady, A. C. Burmingham (Petrel).
29. Derbyshire and Lancashire Gliding Club—R. D. Roper, H. O. Midwood (Gull I).
30. R. D. Dickson, G. Thompson, P. W. Leech (Viking).
31. Sr. Ortner (Olympia).

H. Wheatcroft, C.F.I. of the London Gliding Club, ready to take-off.

cancels out the skill of the pilot. The precise time of launching matters a great deal.

That ten pilots should succeed in getting away from a 700ft winch-launch in the difficult, windless conditions shows the great progress which thermal-soaring technique has made since the war. Before long, the retrieving trek started in earnest. G/C. Murray and F/L. Mallett were followed by their retrieving teams in 15-cwt Service lorries as closely as roads would allow, greatly assisted by their two-way radio-telephone sets, which were functioning well. The long sailplane trailers, incidentally, had to pass on the narrow moorland roads some of the 1,600 cars which were admitted to the official car park.

The light S.S.W. wind invited the pilots who got away to make for Yorkshire. Philip Wills, winner of the last National Contest and holder of the height and distance records, gained a substantial lead by reaching his declared goal at Catterick—the longest flight of the day, 74 miles—in 1 hr 55 min; having climbed to 7,000ft, he covered the last 40 miles of his flight in a straight glide, flying blind on a compass course through cloud and thick industrial haze. Other cross-country flights were achieved by the competitors listed below. J. C.

Name	Mileage	Place of Landing
G/C. W. B. Murray (Weihe)	59	Dishforth
D. Reid (Weihe)	59	East Moor
L. R. Robertson (Olympia EoN)	54	York Airport
L. Wright (Kirby Gull IV)	54	do. (goal flight)
F/L. P. G. Mallett (Weihe)	50	Rufforth
D. G. O. Hiscox (Olympia EoN)	49	Marston Moor
D. A. Smith (Olympia EoN)	31	Lofthouse
P. H. Blanchard (Olympia EoN)	22	Barnsley
J. Ortner (Olympia EoN)	60	Brafferton

Joy Through Strength

A Simple Treatment of the Use of Load Factors in Aircraft Design

By S/L F. S. BLOOMFIELD, M.A., A.M.I.C.E.

WHILST ignorance might not be actually blissful, it is frequently comfortable in the sense that knowledge may make one somewhat uneasy. Pilots who, with care-free *elan*, chase about the sky in all manner of curious evolutions, generally have but a hazy notion of the forces imposed on their aircraft during such manœuvres; which is, perhaps, as well for their peace of mind. Nevertheless, for those who occasionally do pause to consider how strong an aircraft has to be, some broad considerations of load factors may well be of interest.

During manœuvres such as turning, looping, pulling out of a dive and so on, the wing lift is considerably greater than that in normal horizontal flight. In point of fact, when an aircraft is pulled out of a dive, the lift might well be five times that experienced in straight and level progress As a consequence, the loads on the various members of the airframe will be considerably increased, and allowance is made for this increase during the design stages. For the purpose, what are known as load factors are employed.

The principle is essentially simple. Considering an aircraft of 1,200 lb all-up weight pulling out of a dive at 300 m.p.h. and so flying along an arc the vertical radius of which is 1,500ft, the laws of centrifugal force show that there must be a net force of $\frac{wv^2}{gr}$ lb acting through the aircraft towards the centre of the arc, where

w = weight of aircraft, lb
v = speed, ft/sec
r = radius of arc, ft
g = acceleration due to gravity = 32.3ft/sec/sec

This force toward the centre of the arc is translated as increased lift by the wings which, in addition, must also support the weight of the aircraft,

$$\therefore \text{lift} = \frac{wv^2}{gr}$$

$$= 1200 + \frac{1200 \times \left(300 \times \frac{88}{60}\right)^2}{32.2 \times 1500}$$

$$= 1200 + 4810$$

$$= 6010 \text{ lb}$$

It is thus seen that, during pull-out from this dive, the *apparent* weight of the aircraft has increased some five times. It should, however, be noted that the acceleration toward the centre of the arc is actually 4*g*, as the true weight of the aircraft is, of course, essentially constant due to the pull of gravity.

Method of Calculation

To allow for such increased loads on the airframe members, the designer first determines the loads the members will have to carry in normal flight—i.e., with lift equal to weight—these being termed the basic loads. The basic loads are then multiplied by 5 to cater for such a manœuvre as described, and then are further multiplied by 2 to provide a factor of safety, i.e., × 10 in all. The component, if a tension member, is then designed to a stress equal to the ultimate tensile stress of the material. Referring back to our example, the load of 6,010 lb would be termed the design load for this manœuvre, and the factor 10 is the ultimate load factor, thus the design load = basic load × ultimate load factor.

The factor of safety of 2 is introduced to cover possibilities such as material not being up to specification, defective workmanship, unauthorized manœuvres and so forth, and although at first sight it may be thought that this is an unduly high allowance, it should be remembered that a usual factor of safety in general engineering is 4—but in special cases even higher. To use such a factor of safety as 2 is, figuratively speaking, skating on rather thin ice, and is made possible only by the imposition of a very strict system of inspection, both of materials and workmanship.

The ultimate load factor may be defined as the ratio of a component's breaking load to the load in normal horizontal flight. Once again, example may clarify the situation. It can be assumed that in pulling out of a dive, the lift on the wings is equivalent to 7 times the normal all-up weight of the aircraft. It may also be assumed that the basic load on a particular bracing wire is 200 lb, whilst the ultimate tensile strength of the material is 60 tons/sq in. It is required to calculate the minimum cross-sectional area of the wire :

Ultimate load factor $= 7 \times 2 = 14$

Design load $= 200 \times 14 = 2{,}800$ lb

Cross-sectional area $= \dfrac{\text{breaking load}}{\text{ultimate tensile stress}}$

$= \dfrac{2800}{2240 \times 60}$ sq in

$= 0.0208$ sq in

It is, however, not sufficient to limit the calculations to a determination of the minimum size of wire to avoid fracture. Consideration must also be given to the possibility of the wire becoming permanently stretched due to the yield stress or proof stress of the material being exceeded. This introduces the proof load factor.

Redesigning a wire

In the last example, the actual load on the wire during the manœuvre would have been 200 times 7 lb and the stress $\frac{1400}{0.0208}$ lb/sq in = 30 tons/sq in. If the yield stress or 0.1 per cent proof stress of the material were less than 30 tons/sq in—say 25 tons/sq in—it follows that the wire would be permanently stretched as a result of this manœuvre, and the airframe thus become distorted. Such permanent stretching is dangerous as it imposes extra loads on other members of the airframe. In order to preclude this sort of thing occurring, the wire is re-designed as follows :

Actual load on wire $= 200 \times 7 = 1{,}400$ lb

Factor of safety $= 1\frac{1}{2}$

Area of wire $= \dfrac{\text{actual load} \times 1\frac{1}{2}}{\text{proof stress}}$

$= \dfrac{1400 \times 1\frac{1}{2} \text{ sq in}}{2240 \times 25}$

$= 0.0375$ sq in

The second factor of safety of $1\frac{1}{2}$ is employed to cater for the possibility of the aircraft being called upon to carry out unauthorized manœuvres—a not uncommon occurrence in war-time. In the second calculation, the proof load factor ($10\frac{1}{2}$) was obtained by multiplying first by 7 and then by $1\frac{1}{2}$. Since the second factor of safety ($1\frac{1}{2}$) is $\frac{3}{4}$ of the first factor of safety (2), it follows that the proof load factor = $\frac{3}{4}$ of the ultimate load factor.

Had the yield stress or proof stress of the material been $\frac{3}{4}$ of the ultimate tensile strength (i.e., $\frac{3}{4}$ of 60 = 45 tons/sq in), both calculations would have produced the same result, viz., 0.0208 sq in. If the yield stress had, however, been greater than $\frac{3}{4}$ of the ultimate tensile stress, the design would necessarily have been dependent on the ultimate tensile strength. Calculations may further be simplified if the proportion between yield stress and ultimate tensile stress is first determined, for it is then necessary only to do one calculation.

A moment's consideration will make it clear that certain

members of the airframe are most heavily loaded during the performance of given manœuvres, whilst other members are most severely stressed during entirely different conditions. As it is virtually impossible to consider all the manœuvres to which an aircraft may be subjected, it is usual in the design of civil aircraft to consider only eleven. The following list of these eleven conditions is not, however, exhaustive; the full design requirements as published by the Air Ministry contain several sub-divisions as well as many subsidiary requirements.

The ultimate load factors are based on measurements made with an accelerometer in the aircraft, but are also dependent to a great extent on design experience. When referring in general terms to the load factors to which an aircraft has been designed, the highest ultimate load factor is implied—in this case, 9. The higher the load factor, the heavier and stronger the aircraft and, consequently, the less the useful load. This being the case, it would patently be uneconomic to make the load factor unnecessarily high: the usual figure for heavy transport aircraft is 5, but such machines are, of course, not intended to perform aerobatics.

The Eleven Conditions

Centre of pressure forward: ultimate load factor = 9. This manœuvre corresponds to that of an aircraft travelling at top speed and suddenly assuming the stalled position without appreciable loss of speed. The centre of pressure would thence be in the forward position. This would occur if an aircraft diving vertically at its terminal velocity were pulled out of the dive very suddenly.

Centre of pressure back: u.l.f. = 6. In this case, it is assumed that the aircraft diving at its terminal velocity is pulled out more gradually than before and assumes its normal flying attitude without appreciable loss of speed. In this attitude, the centre of pressure will be about half-way along the chord; it is, of course, not such a severe manœuvre as the foregoing and therefore the load factor can be lower.

Up gusts and down gusts: u.l.f. = 2. It is assumed that the aircraft flying at top speed in a horizontal attitude encounters a gust with a vertical component of 25ft/sec.

Fast glide: u.l.f. = 2. The aircraft is considered to be gliding at 1½ times its top speed with engine off.

Landing: tail up (*u.l.f.* = 1.15) *: tail down* (*u.l.f.* = 4) : *one wheel* (*u.l.f.* = 3) : *braked undercarriage* (*u.l.f.* = 4). These conditions are introduced primarily to cover the requirements of the landing gear but, in addition, necessarily affect the fuselage and wings of the aircraft.

Diving: u.l.f. = 2. The aircraft is assumed to be diving at its terminal velocity, but not greater than 450 m.p.h.

Inverted flight: u.l.f. = 4.5. It is assumed that the angle of attack of the aircraft when upside down is suddenly increased so that the centre of pressure moves to the forward position.

Once more considering a bracing wire of circular cross-section, three typical conditions of flight can be taken for a working example. It may be assumed that it is required to determine the diameter of the wire to meet the most extreme flight condition, i.e., c.p. forward = 900 lb; ultimate load factor = 9. The ultimate tensile strength is assumed to be 50 tons/sq in, and the 0.1 per cent proof stress to be 35 tons/sq in.

It is known that the maximum design load is 8,100 lb (900 × 9) and it must then be decided whether to design on the ultimate tensile strength or the proof stress, and as ¾ of 50 tons/sq in = 37.5 tons/ sq in, and the proof stress is less than this (35 tons/sq in), it is clear that the wire must be designed on the latter.

$$\text{Proof load factor} = \tfrac{3}{4} \text{ of } 9 = 6.75$$

$$\text{Area of wire} = \frac{\text{basic load} \times \text{proof load factor}}{\text{proof stress}}$$

$$= \frac{900 \times 6.75}{2240 \times 35} \text{ sq in}$$

$$= 0.0775 \text{ sq in}$$

$$\therefore \frac{\pi d^2}{4} = 0.0775$$

$$d^2 = 0.0775 \times \frac{4}{\pi} = 0.0987$$

$$d = \sqrt{0.0987}$$

$$= 0.3142 \text{in diameter}$$

Whilst high speeds in themselves impose no strain on the human body, the average pilot cannot withstand a manœuvre in which the aircraft is stressed to more than about 4 or 5*g*, although cases are not unknown of pilots who can cope with 7*g* before blacking out. The limitations of the average pilot necessarily affect the design of the aircraft, as there is obviously no advantage to be gained in building an aircraft capable of carrying out manœuvres much more severe than a pilot can endure. If a pilot and aircraft are to have the same limitations, then a limit of 5*g* for the pilot would mean designing the aircraft to an ultimate load factor of 10.

ANTARCTIC "AIR LIFT"

THE Governor of the Falkland Islands, Sir Miles Clifford, has ordered from Canada a Norseman aircraft, with floats and skis, for the rescue of the seven British explorers and scientists at Marguerite Bay, Graham Land, if the Antarctic supply ship *John Biscoe* fails to force a passage through the pack ice early next year.

The aircraft will be shipped from London when the *John Biscoe* sails this November on her annual rounds of British outposts in the Antarctic. She will also carry two Mk 5 Auster aircraft equipped with floats.

The men at Marguerite Bay have had no mail since the *John Biscoe* called there in February, 1948. The earliest the supply ship can hope to force the ice pack is February, 1950, and in all probability the Norseman will be used to fly Christmas mail to the Base.

Sir Miles Clifford, who is responsible for all British outposts in that section of the Antarctic administered by the Falkland Islands (on behalf of the Colonial Office) is taking no chances on the ship failing to force the ice-pack two years running. If she fails, and if ice-conditions permit, the Norseman will be used to evacuate the Marguerite Bay base.

There are vast areas of smooth ice between the islands off the coast of Graham Land, and they offer ideal take-off conditions. Even after the spring break-up in November there are large areas of shelf-ice—ice which has not broken away from the coast. Sometimes, however, the shelf-ice at Marguerite Bay breaks away during the spring break-up, and this would present the Norseman with impossible landing and take-off conditions.

It is possible that the aircraft will operate from Hope Bay (on the north-west coast of Graham Land) which was evacuated earlier this year following a disastrous fire at the base hut. If the conditions of the ice prevent the Norseman from landing at Marguerite Bay to evacuate explorers' personnel, it will be used to parachute supplies to them—supplies of which, by then, they will probably be in great need.

FORTHCOMING EVENTS

Aug. 17th-27th.—Model Engineer Exhibition, New Horticultural Hall, London, S.W.1.
Aug 21st to 28th.—British Gliding Association: National Gliding Contests, Gt. Hucklow, Derbyshire.
Aug. 28th.—Cowes Aero Club: Air Display.
Sept. 3rd.—Association of British Light Aero Club and Centres: Summer Conference, White Waltham.
Sept. 6th to 8th.—R.A.F. Golfing Society: Autumn Meeting and Ladies' Section Championship at Walton Heath Golf Club.
Sept. 7th to 11th.—S.B.A.C. Annual Flying Display and Exhibition, Farnborough.
Sept. 7th.—R.Ae.S. (Luton): "Air Liner Operation."
Sept. 12th to 18th.—Battle of Britain Week R.A.F. "At Home" day Sept. 17th.
Sept. 14th.—Inter-Services Swimming Championships, Seymour Hall, Marylebone, London.
Sept. 15th.—R.Ae.S.; Fifth British Commonwealth and Empire Lecture, "Inter-City Transport Development on the Commonwealth Routes," by E. H. Atkin, F.R.Ae.S.
Oct. 5th.—R.Ae.S. (Luton); Film Show.
Nov. 2nd.—R.Ae.S. (Luton); "Gas Turbine Development."
Nov. 23rd.—R.Ae.S. (Luton); "Brains Trust."
Dec. 7th.—R.Ae.S. (Luton); "Role of Aircraft in Future Warfare," Air Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

BATTLE OF BRITAIN WEEK

A Special Appeal

From the Rt. Hon. Lord Riverdale, G.B.E.

AS Battle of Britain Week (September 12th-18th) comes round again, may I ask each of your readers these personal questions:—

Do you remember, during those sunny days of 1940, helplessly watching the vapour-trails of the Hurricanes and Spitfires which shot the Lutfwaffe from the sky? Do you remember your gratitude to the men who fought this epic battle, and the many other air battles—both offensive and defensive—which followed?

If you remember these things, you will recall that our air victories were not achieved without paying the price of broken homes, whose husbands and sons lost their lives (in many cases leaving widows and children needing help) or were maimed, perhaps for life.

This is where the R.A.F. Benevolent Fund plays its part and by helping serving and former members of the Royal Air Force and their dependents in need. During the past five years the Fund has spent over two million pounds on assistance. Last year, the figure was £668,656, an increase of 26 per cent on the previous year, whereas our income dropped by 33 per cent. Unfortunately we cannot yet tell when the call for help will cease to be made; indeed, we are still helping cases from the 1914-1918 war.

I appeal to everyone to give as generously as possible—either at one of the airfields open during Battle of Britain Week, or by sending a donation direct to me at the R.A.F. Benevolent Fund, 1, Sloane Street, London, S.W.1 (Sloane 1681). All gifts—whether cheques, postal-orders or stamps—will be gratefully acknowledged.

RIVERDALE,
Chairman of the Council, R.A.F. Benevolent Fund.
London, S.W.1.

AUSTERITY AIR TRAVEL

No Comparison with Railways ?

I SUGGEST that Mr. Thomas D. Keegan (August 11th) makes a mistake in comparing air travel with railway journeys, whereas it is much more akin to sea travel. By all means economize wherever possible and, perhaps, charge extra for refreshments (and even the airport bus), but things which might be luxury on the railway are not necessarily so in the air. The aircraft moves in a different medium from the train and passengers are more prone to be nervous or even unwell. That is where the presence of a hostess or steward is desirable on the longer journeys; and the captain, like the captain of a ship, is interested in the welfare of his passengers and leaves a competent officer in charge while he makes his rounds.

At the airport, it would be most undesirable for passengers to wander aboard the airliner just when they pleased, and most people, if they are going abroad by sea or rail, book their passage through a travel agent.

One of the selling points of air travel (at any rate, with the present size of aircraft) is that one travels in comfort as an individual and not just as one of a herd. We have enough of austerity elsewhere without applying it to the air.

Esher, Surrey. S. B. PARKINSON.

In Favour of "Personal Initiative"

YOUR correspondent, Mr. Thomas D. Keegan, brings up an interesting point in his letter published in your journal on August 11th. I can remember travelling between London and Waalhaven (Rotterdam) when you received no attention during the flight and, some time later, when you were given a luncheon box in case you felt hungry. Competition has since brought the tasty and well-planned meal, served expertly by charming stewardesses. But it is either that or nothing. So long as free meals are offered they must be up to present-day standards.

We must not forget that, from the moment the passenger enters the airline's office and is shown into the airport coach, to the moment when he has left the bus at the other end, he is generally carried over the usual hours of meals. The solution, then, is either sale of luncheon-boxes before entering the aircraft or to take his own lunch with him. In fact, austerity travel would be "normal" travel and the traveller is his own master. He can show initiative by preparing his lunch, taking his own books or papers and his own maps of the route to be travelled. All this is fun; it comes nearer real travelling, which is not the herding of a number of people according to a fixed plan.

Much as I appreciate the airlines' courtesy and fine service, I also would prefer doing some things myself, especially if it would mean cheaper fares. If cheap air-coach travel existed between Holland and other European countries, rid of all that your correspondent calls "expensive frills," with probably less luxurious seats and possibly at less convenient hours, I would be one of its many customers.

Experts will tell us that it will make no difference to the overheads. I do not believe it. It is bound to come.

J. VAN HATTUM, A.F.R.Ae.S.

The Hague.

Reassuring the Passenger

THE complaint of Mr. Thomas D. Keegan will not, I fear, meet with much sympathy in any quarter. While airline passengers continue to pay considerably higher fares than they would do for journeys of similar length by surface transport, they rightly expect, in addition to the much higher speed, a generous laying-on of creature comforts—hence the "tea and buns" which apparently cause your correspondent so much annoyance.

This tradition of catering for the airline passenger's inner man—for undoubtedly it is a tradition—was almost certainly born of a desire by the earlier operators to convince the public that air travel was not an uncomfortable, noisy, dangerous and thoroughly adventurous method of travel. I can well remember how, in the early nineteen-thirties, first-time passengers, nervous at first, were soothed into purring complacency by the delightfully served lunch (on Pullman-type tables, with snowy cloths) on the old Imperial Airways *Heracles* class.

Even to-day there are still plenty of first-time air travellers (perhaps, in view of the post-war redistribution of incomes, more than ever there were). If the airline companies want to make quite sure of these converts by a few judicious surprises in the way of good food and courteous service, who is to blame them?

In my own view, the whole business merely serves to throw into relief the appallingly bad service in this respect given by the railways (of post-war sea travel I am not in a position to speak). The other day, travelling North on what was supposed to be one of our crack trains, I sought a wash, only to find no water, either hot or cold, no towels, and the whole place in a state of filth which would have disgraced the accommodation of a public-house in a slum district. An observation on this fact, made more in sorrow than in anger to a passing ticket-collector, brought only a grunt by way of reply.

The moral, *vis à vis* train travel and air travel, seems almost too obvious to need pointing out. GULLIVER.

London, W.3.

URBAN AVIATION

More Memories of the Acton Airfield

MR. REYNOLDS' letter in your issue of August 11th gives support to my suggestion that the early aircraft in question may well have been the Piffard. The reference to Caudron biplanes, later to find their way to the same field, is accounted for by the fact that the Ruffy-Baumann School of Flying commenced operations at Acton when they (together with Beatty, Lawrence-Hall, and others) were evacuated from Hendon by the R.F.C. in 1917 or thereabouts.

I saw the tattered canvas hangars and the derelict Caudrons on this field early in 1920, where they had been abandoned by Ruffy-Baumann's when they closed down after the 1914-18 war.

At one end of the same field the Alliance Aircraft Co. had built a factory. In 1919 they designed and built an aircraft which was to attempt a flight to Australia. When the great day came it got as far as Surbiton, where it crashed, killing its crew.

Shortly after this tragedy, Lord Waring closed the factory and that concluded, for all time, the use of this field as an aerodrome. FRANCIS KAPPEY, A.F.R.Ae.S.

Shorwell, Isle of Wight.

SERVICE AVIATION

"Flight" photograph

DEMONSTRATOR: S/L. C. H. Macfie, D.F.C., puts through its paces a D.H. Vampire 5 fighter-bomber of the B.A.F.O. Squadron which he commands. This speedy impression was made during the display held on Tuesday of last week at Gütersloh, Germany, and described on pp. 210-12 of this issue.

Improved Hastings

EXPERIENCE gained in both manufacture and operational use of the Handley Page Hastings 1 transport has resulted in a number of minor modifications to the design and construction of the machine. Aircraft now going into production will embody these changes, and are to bear the designation Hastings C.2.

The tailplane of the new Hastings, which is of increased area (442 sq ft instead of 401 sq ft) has been lowered from the top to the centre line of the fuselage, and the elevators now incorporate spring-tabs. Extra tanks in the outer wings have increased the fuel capacity from 2,560 gall to 3,174 gall. Aluminium oil coolers and lighter electric cables have been fitted, and an electric priming system replaces the former hand-operated type. Instead of the crews' rest station, the Hastings 2 will have an air quartermaster's position.

R.A.F. Appointments

AMONG new appointments announced by the Air Ministry is that of A.V-M. R. L. Ragg. C.B., C.B.E., A.F.C., as Senior Air Staff Officer at H.Q., Far East Air Force, with effect from July 26th. Since April, 1948, A.V-M. Ragg has been S.A.S.O. of Transport Command, before which he commanded No. 63 (Western and Welsh Reserve) Group for nearly two years. In April, 1945, he became Air Officer in Charge of Administration, Base Air Forces, South-East Asia, and in 1946 held a similar appointment with Air H.Q., India, for a short time before returning to England to command 63 Group. Born in 1901, he was commissioned in the R.A.F. in 1921.

With effect from August 2nd, A.V-M. A. C. Sanderson, C.B., C.B.E., D.F.C., was appointed to the Air Ministry as Director-General of Personnel (1). Since 1946, when he finished a three-year spell at the Air Ministry as Director of Administrative Plans, A.V-M. Sanderson has served overseas. From November, 1946, until April, 1947, he was A.O.C. Air H.Q., Burma, and, before taking up a similar appointment in Malaya in 1948, spent just over a year as A.O.A., Far East Air Command. Aged 51, he served with No. 16 Squadron in the 1914-18 war and was awarded a permanent R.A.F. commission in 1920.

Taking the acting rank of air vice-marshal, A. Cdre. C. E. H. Allen, C.B., D.F.C., became Senior Technical Staff Officer at H.Q., Middle East Air Force, on July 23rd. Between 1940 and 1946 A.V-M. Allen commanded two of the major centres of R.A.F. technical training in the United Kingdom—Henlow and Cosford. Since September, 1946, he has been Senior Air Officer of No. 43 Group, Maintenance Command. He was born in South Africa in 1899, and entered the R.F.C. as a mechanic in May, 1917, being commissioned four months' later.

Royal Air Force and Naval Aviation News and Announcements

Devons at Hendon

SUPPLEMENTING the unit's existing fleet of Ansons, D.H. Devon communications aircraft are now in service with No. 31 Squadron at Hendon. Formerly known as the Metropolitan Communications Squadron, "31" was formed from a flight of No. 24 Squadron, the R.A.F.'s pioneer transport unit, and is at present the "taxi" squadron of Transport Command. Its duties include carrying Service officers and government officials on urgent missions about the United Kingdom and the Continent.

No. 31 Squadron also provides air ambulances for flying Service stretcher cases to hospital. For this work, at least one Anson, with crew and nursing orderly, is always standing by at Hendon. One of these machines was recently airborne within 11 minutes of receiving a request from Shawbury to fly a seriously injured airman to hospital. Further instructions were radioed as it flew to Shawbury.

At week-ends the Squadron is occupied with giving air experience to A.T.C. cadets in the form of flights over London. It maintains a "fly-yourself" service, with Ansons and Proctors, for Air Ministry and Transport Command H.Q. officers, who are thus able to keep in touch with flying while making staff visits. The Squadron's training flight makes periodic tests of the squadron pilots and also trains new pilots up to the required standards.

R.A.F. Cycle Meeting

AT the Herne Hill Cycle Track, London, S.E., the R.A.F. Cycling Association will, on September 1st, hold five events in its series of track championships—the 1,000 metres time trials, the 4,000 metres individual pursuit, the 4,000 metres team pursuit, and the ten miles scratch. The 100 km massed-start station championships are to take place at St. Athan on September 10th. Teams will consist of four riders, each station being permitted to enter more than one team for this event.

Synthetic Blitz

A SYNTHETIC trainer to simulate air attacks of any size, from a lone raider to a mass raid of 1,000 bombers, has been developed for R.Aux.A.F. fighter control units. This device will give the units practice in the early warning system and experience of reporting raids without the need for flying aircraft.

The trainer is a massive piece of apparatus which would fill an average-sized living room. It is virtually a radar station, with two screens which show as "blips" the bearing and height of approaching aircraft. Pre-determined

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"blips" can be superimposed on the screens to behave in a similar manner to those on a normal live station. As they are pre-determined, the operator's accuracy in interpreting their behaviour can be checked. The first of these trainers is now being tested, and ultimately 13 will be shared among the fighter control units. The trainers are in addition to the synthetic operations rooms which are to be provided at each F.C.U.

R.A.F. Horticultural Show

THE Minister of Food, Mr. John Strachey, will open the R.A.F. Horticultural Show on September 27th. To be held at the Royal Horticultural Society's Hall at Westminster, the Show will be open free to the public for two days, September 27th and 28th.

B.A.F.O. Dining Hall

A DINING hall to seat 700 has been opened for airmen and airwomen at H.Q. British Air Forces of Occupation, Bad Eilsen, Germany.

The hall took five months to complete and was built by German labour under the supervision of No. 5357 Airfield Construction Wing, R.A.F. Food store rooms are grouped around the well-equipped kitchens, and illumination is by fluorescent strip lighting.

Opportunities for Released R.A.F. Officers

THE R.A.F. requires a number of additional air traffic control officers by the end of this year, and invites applications from released R.A.F. officers below the age of 45, willing to serve either in the United Kingdom, or in the R.A.F. Commands overseas, including B.A.F.O., Germany. Released officers, no matter in what ground branch their wartime commission was granted, and released officers of the General Duties Branch who are unfit, on age or medical grounds, for active flying appointments or for return to the G.D. Branch, are eligible. On acceptance, applicants will be given short-service commissions for five years' regular, and four years' reserve service, but retention of the commissions will depend, in certain cases, on successful completion of a three-month air traffic control course.

The Air Ministry explains that, owing to the increasing numbers of squadrons equipped with jet aircraft, and the expansion of aircraft movements, aircraft control is assuming greater importance than ever before. The post of air traffic control officer in the R.A.F. has therefore become one of extreme responsibility.

QUICK ON THE DRAW: Rapid removal and replacement of its four 20-mm Hispano cannon are features of the Meteor 4 which make for a quick turn-round between sorties. Both the nose fairing and the large full-length side panels may be detached in a matter of seconds.

Awards for Ideas

A NEW scheme to encourage Air Ministry staff at headquarters and outstations to submit time and labour-saving ideas has been evolved in co-operation with their representatives. A minimum award of a 10s 6d book token is made for each idea adopted or having special merit, and a note is made in the "inventor's" personal records. The aims of the scheme are to seek ways and means of making the most economical use of man-power and materials, to improve safety precautions, and to stimulate further interest in their work on the part of the staff.

Ideas of local interest will be passed to the section concerned, or forwarded to the appropriate headquarters if of wider interest. The name of the originator will not be made known until a decision has been made. A Staff Suggestions Committee of the Air Ministry Departmental Whitley Council has been formed to control the scheme and to adjudicate on the various suggestions when necessary.

"COASTAL" IN CANADA: Six Lancasters of No. 120 Squadron recently took part in exercises with the Royal Canadian Navy, as part of their goodwill visit to Canada. Commanding the force was G/C. W. G. Abrams (left), seen with G/C. M. G. Doyle, R.C.A.F., the commanding officer of Rockcliffe, one of the stations visited by the Lancasters.

Reunions *

THE R.A.F. Code and Cypher Branch's second reunion, in the form of a dance and buffet, will be held at the Aldwych Brasserie, London, at 6 o'clock on Saturday, October 29th. Tickets (10s) from W/C. L. H. Stewart, 1, Hibernia Rd., Hounslow, Middlesex.

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Former members of No. 74 (Tiger's) Squadron interested in a reunion to be held in London on Saturday, October 29th, are asked to contact the Adjutant, No. 74 Squadron, R.A.F. Horsham St. Faith, Norwich, Norfolk, as soon as possible.

* *"Flight" is always glad to accord brief space to notices of forthcoming Service reunions, without charge.*—ED.